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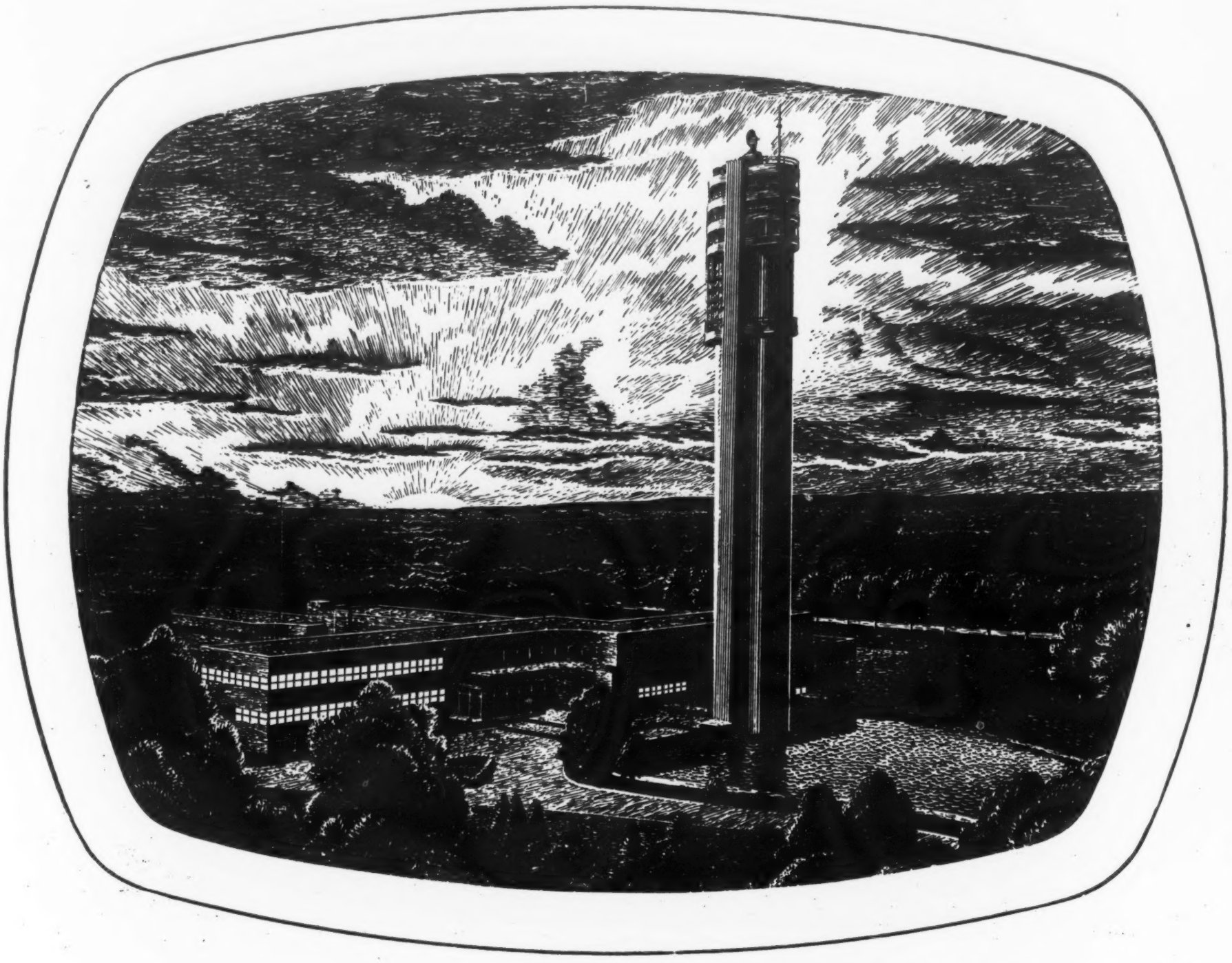

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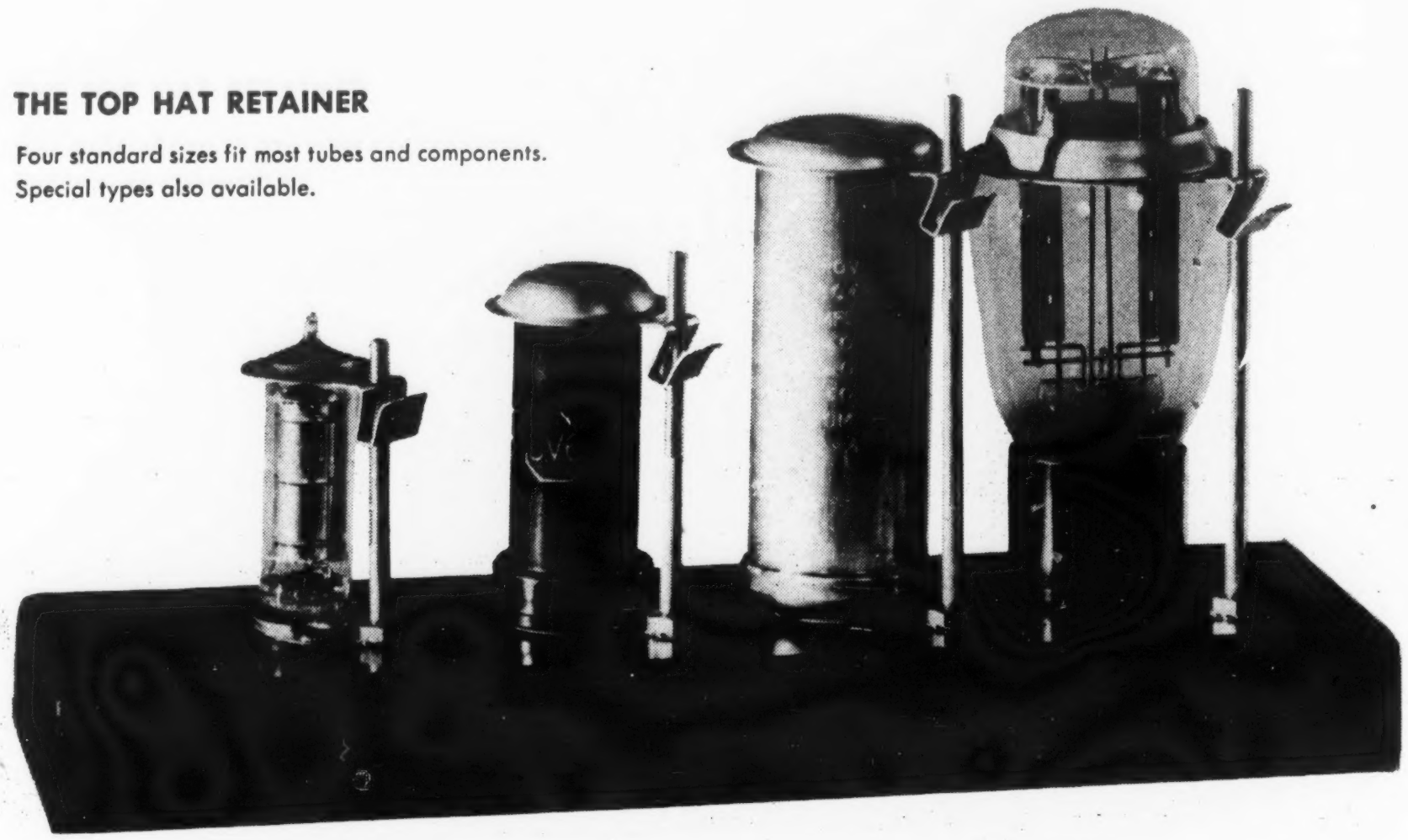

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MILITARY
SIGNALS
LAND ★ SEA ★ AIR

Journal of the Armed Forces Communications Association — Dedicated to Military Preparedness

VOLUME 3 JULY-AUGUST, 1949 Number 6

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FEATURES

DEPARTMENTS

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THE COVER

Portrayed on the cover are AFCA's new president, Fred Lack, and past president Brig. Gen. David Sarnoff. Gen. Sarnoff was AFCA's first president, holding the office for three years.

Here's a Question

—with an unexpected answer!

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A: Yes—if a *Kellogg* Voice Frequency Telephone Repeater is used. The Kellogg Repeater with the standard No. 1 balance network will compensate for the low-pass line filter in the carrier terminal.

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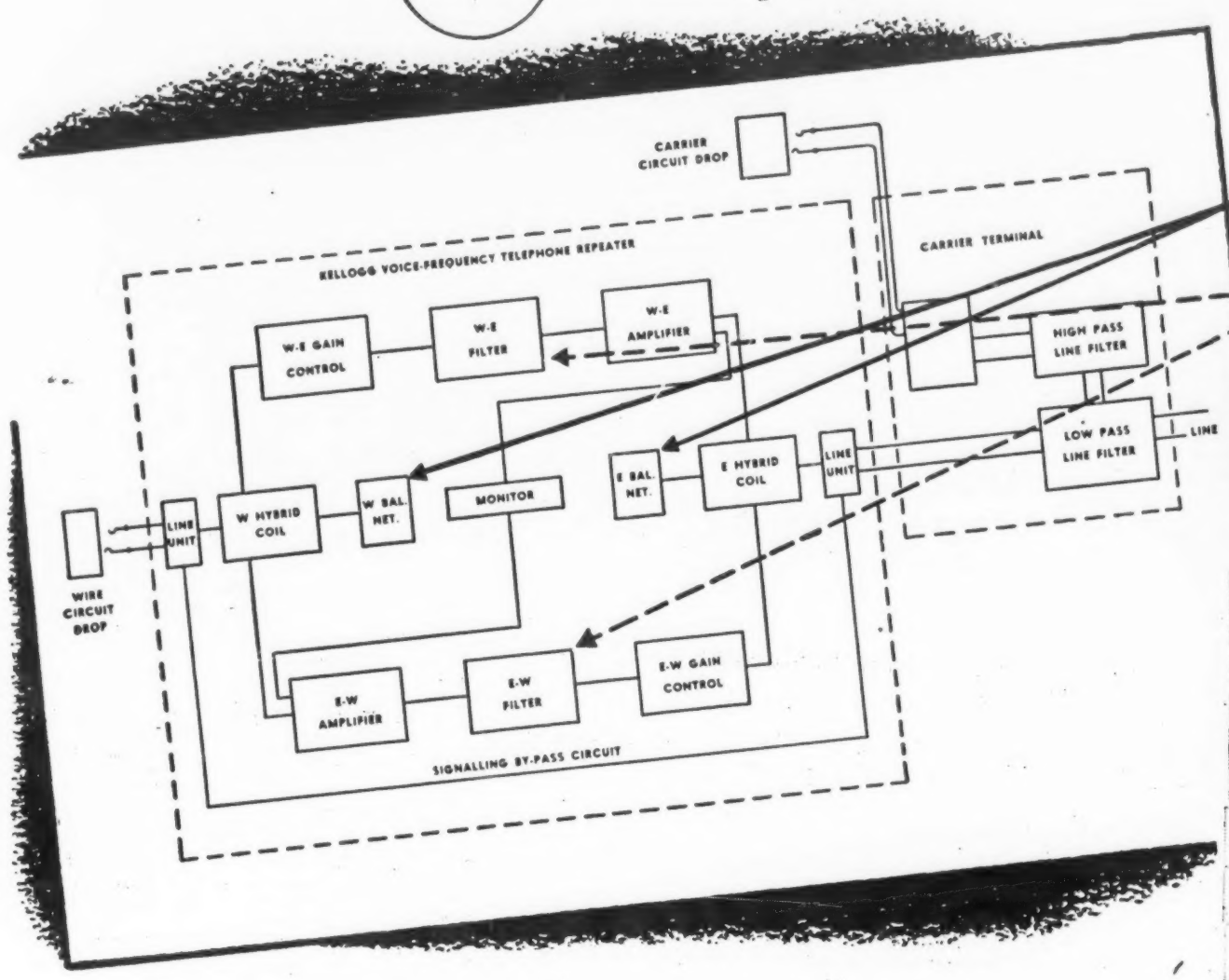

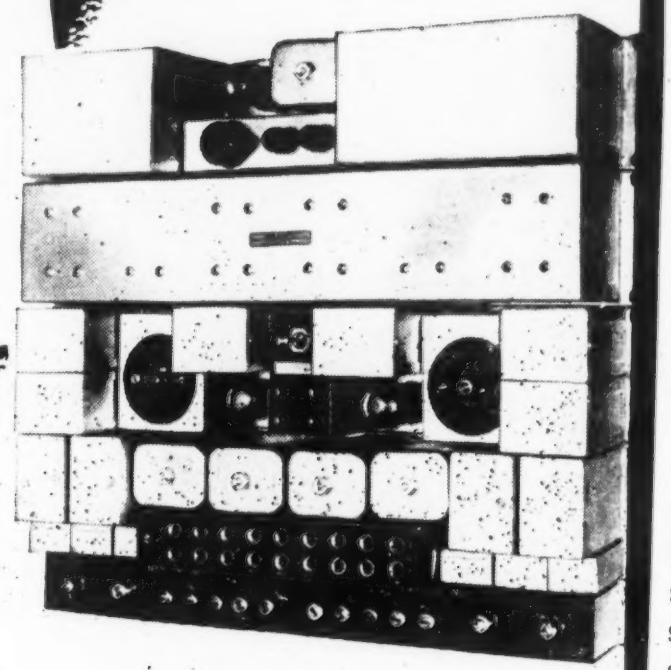

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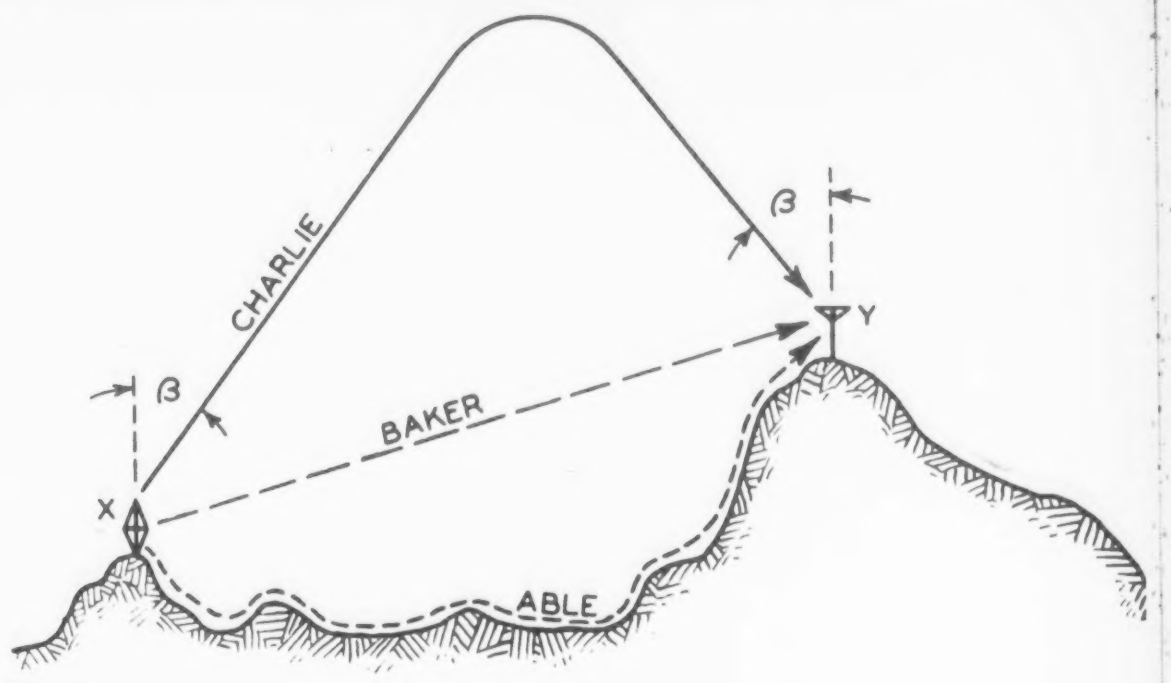

Fig. 1

RADIO PROPAGATION and the USE OF ANTENNAS

By Lt. Col. Loren E. Gaither

"If it's going to happen, it's going to happen; if not . . . it sometimes does anyway!" — *(Anon.)*

One often wonders if some of our military agencies and an appreciable number of communications personnel are not inclined to have this same, quixotic opinion of radio propagation.

Before proceeding, however, may we excuse the hot-shot technicians and the long hairs who can inhale while saying, "integrate the equation and . . .." not that we intend to belittle or fail to recognize their ability; we simply wish to interest only those of the Armed Forces who do not give a tinker's dam about the technical aspects of radio but who are sometimes confronted with the problem of making a radio circuit work. It is our contention that operations personnel and supervisors too often overlook the simple rules of radio propagation and throw away hours of communications by incorrect usage of antennas. It should be common "horse-sense" to understand that, if an antenna does not transmit energy in a given direction, it isn't the fault of the radio set per se! This brings us to two important quasi-theorems:

a. If an antenna doesn't transmit in a desired direction, turn it around so that it does. This is the old mountain-Mohammed routine but it is often overlooked by the faithful.

b. If, at a given frequency, a radio propagation path does not exist between points X and Y, no action short of rolling out the prayer rugs —or changing to a suitable frequency—will establish radio contact.

If we consider theorem b above, we find ourselves concerned with the mechanics of radio propagation, a most complicated mechanism, but fortunately one adaptable to rule-of-the-thumb application. From our viewpoint we will agree that we are not interested in inverse distance fields, nor will we be interested in knowing the electronic density of the sporadic E layer above Pea Ridge, Arkansas at 0101 on 16 August 1941, but we shall be interested in knowing why a perfectly good radio channel, one we have been using all afternoon for 100 per cent transmission, suddenly fades out. The approved solution may be that the late afternoon sun's rays have decreased in intensity to such a degree that the upper atmospheric regions have lost their ability to return the rays to earth. And so, instead of transmitting a requisition for four more tons of Form 36-B-0-0-0 to Base Section, we suddenly start warming poor Uncle Snazzy's spirit; which at the moment happens to be wandering midway between the fourth and fifth psychic planes, someplace in the vicinity of Pluto.

We most certainly should be interested in knowing how radio signals travel from X to Y; all of which brings us to the low habit of referring to Fig. 1. If our transmitter has sufficient power perhaps we can use path Able. If the path of least resistance is Baker, we may use path Baker. If neither Able nor Baker will work we may, in some cases, use path Charlie by selecting a proper frequency. Of course we will not overlook the possibility of signals arriving at the same instant over paths Able, Baker, and Charlie. If this happens we normally expect great trouble in the form of rapid fading of the signals. For a first approximation may we state that Able and Baker are rather solid citizens but Charlie is quite a lackadaisical rake; here today and gone tomorrow!

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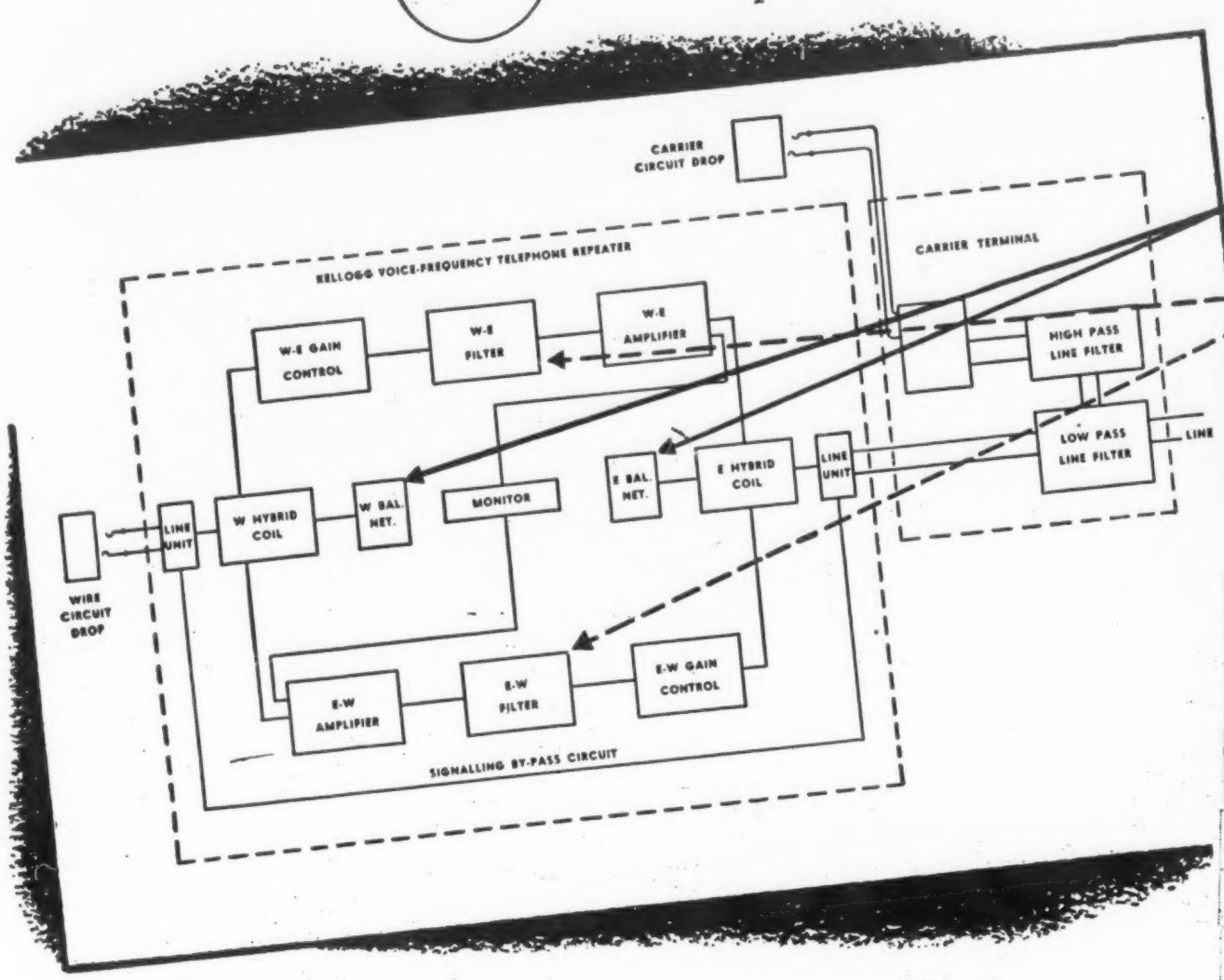

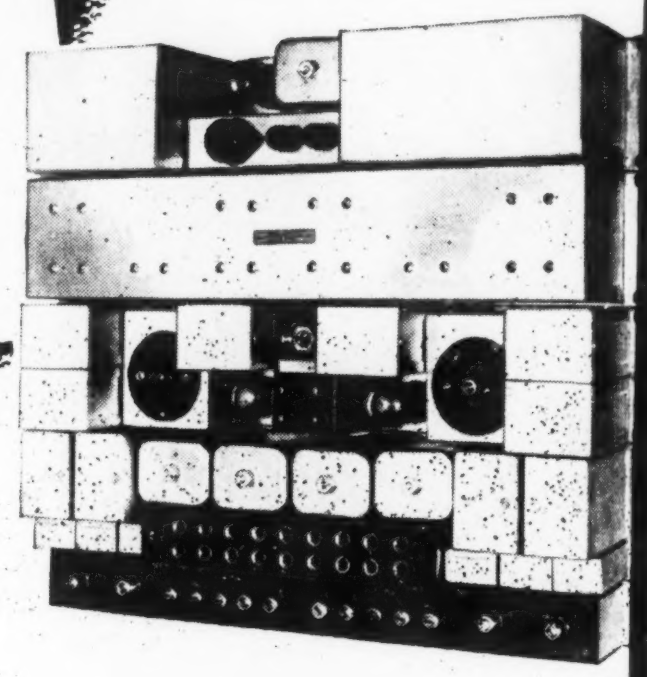

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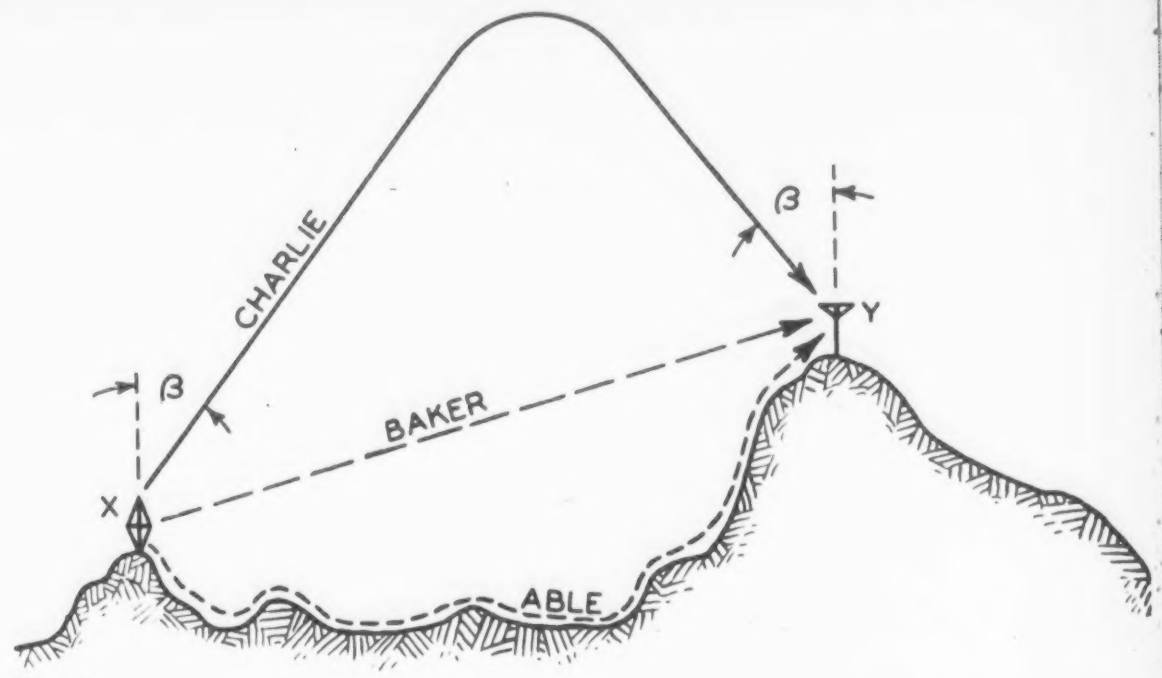

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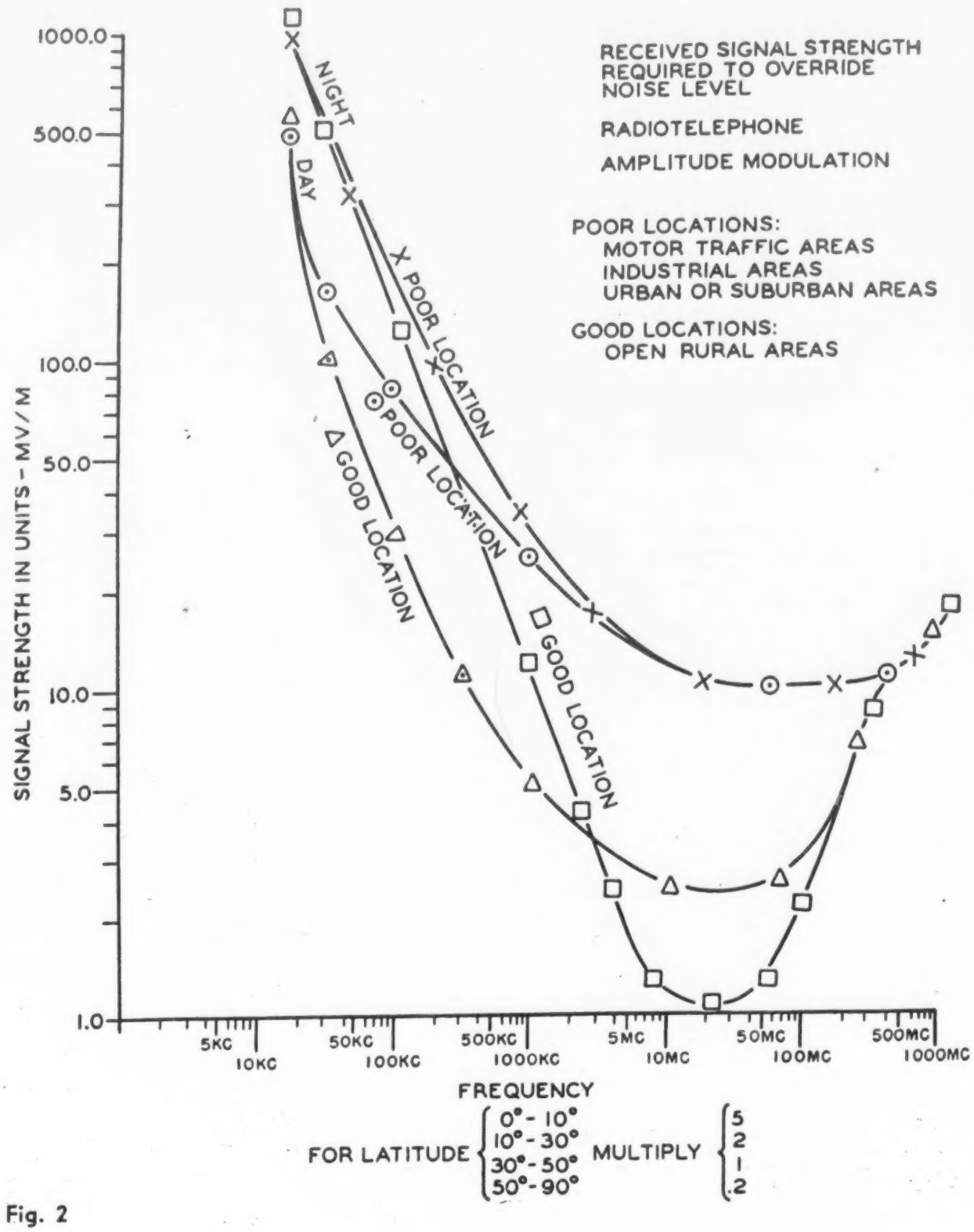


Fig. 2

the ground and the characteristics of the ground are controlling factors in determining whether or not we can successfully use the "ground-wave" for communication. If, for example, we find ourselves in the North Country where, so I've been told, it's fine for women and dogs, but hell on men and radio, we may find that low frequency, ground wave propagation is virtually the only means communicating with Fort Blow, back of the mountains. All right, if we are so smart, where can we, and where can we not, use Path Able?

Noises

Permit us, right here, a defensive statement or two before we stick out our neck. "Noise Level" may upset our very best calculations in a few cases. If, for example, an electrical storm has the sky all lit up like father on Christmas Eve we may find a high noise-level over-riding our strong signal-level; and so no communications. If not that, Joe Giezel may decide to denude his cheeks (by Schick) with the same net result . . . all noise and no signals. We can protect ourselves to some degree by plotting average expected noise for a given location and so to Fig. 2. Here we optimistically combine atmospheric noise, cosmic noise, man-made noise in a pseudo-military area, receiver noise, and antenna noise into four simple curves for good and poor locations and we state that at a given frequency, subject to variations of local storms, we expect to find these noise levels (in microvolts per meter or, let us say, for simplicity, in *units*) in all regions of approximately 30 to 50 degrees of latitude, north or south. Correction factors for other latitudes are listed above, Fig. 2.

Signal & Noise Levels

The first, or should we say basic, requirement for communications is the necessity of the signal-level overriding the noise-level; therefore, the approximate data in Fig. 2 gives us the all important starting point. For any frequency we may read the noise level expected and then observe other factors to ascertain if the path will be workable with the equipment we have on hand.

To effect the final solution of our ground wave propagation problem we will need the information given in Figures 3 and 4. The important, general information we get from Fig. 3, at first glance, is the observation that ground wave propagation over earth is not feasible above 5,000 kilocycles, except for very short distances in the order of one tenth mile to ten miles, depending upon our power output. To say this in another way, *frequencies above 5.0 MC (megacycles) are virtually useless with military field equipment for covering distances in excess of ten miles by use of the ground wave.*

The second most important, quick information we can glean from Fig. 3 is to note that the lower the frequency, the better the propagation *using ground wave only.*

At this point, assuming one has studied Figs. 3 and 4; to those who have become discouraged, to those who may suspect that ground wave propagation is generally less efficient than a yak-cart, may we reiterate that it is *sometimes the only way* one can maintain contact. In any event, "leave" us observe two examples.

Or Else

Suppose the General wishes to communicate by radiotelephone with a station 80 miles distant. The receiving station is located behind a range of mountains. Sky Wave Propagation has failed. The receiving site has an approximate latitude of 70° The intervening terrain consists of low, rocky hills. We do not have specific knowledge of receiving conditions at the receiver so we assume a poor location as a factor of safety. Our transmitter and antenna has a radiated power output of 40 watts.

Since the required frequency is the factor we wish to calculate, we cannot immediately use Fig. 2 but we may study Figures 3 and 4. Here we note that the distance must be, in effect, increased by reason of the actual transmitter radiated output being 40 watts instead of the 50 watts. which was the basis of the plotted data. Our power ratio is therefore $\frac{40}{50}$ — or .8. Selecting this value on the vertical scale of Fig. 4 we read .85 on the horizontal. But if we use

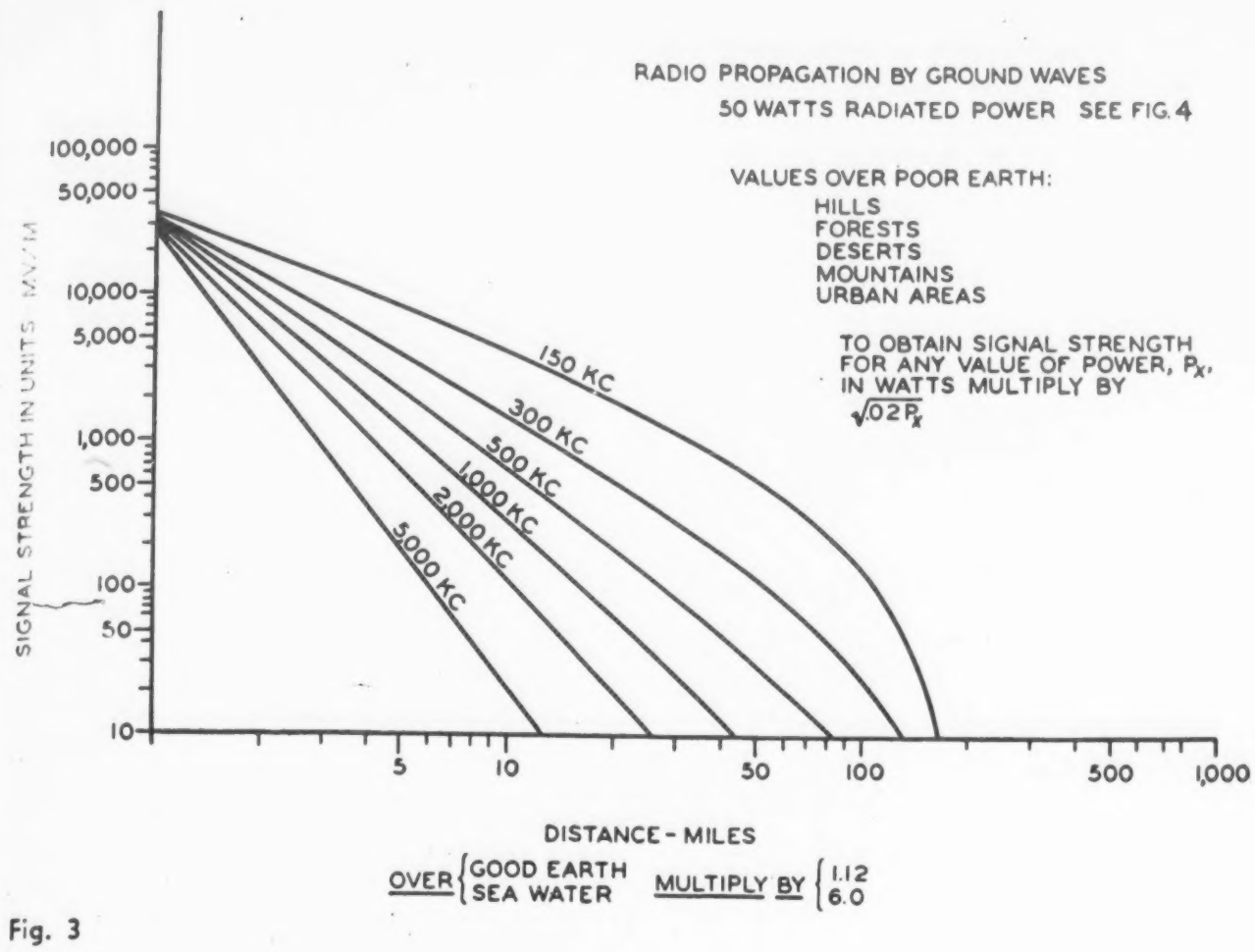


Fig. 3

.85 × 80 miles = 68 miles,

this distance will not have any significance, for it is a shorter distance instead of a longer distance. The distance $\frac{80}{.85}$ = 94 miles does have significance. In decreasing power we, in effect, increase distance. This 94 miles is the "apparent" distance upon which we must base our analysis. Now, from 3 we note that approximately 450 KC will be the minimum frequency we may use for a 94 mile path providing we can get satisfactory reception with a 10 unit signal strength. Fig. 2, for a 450 KC signal, at night, in a poor location, indicates we will need a 50 unit signal strength but the "latitude factor" listed in Fig. 2 allows us a factor of .2 thus,

50 × .2 = the number of units required,

and so, having examined both the noise level and the signal strength, we are confident our selection of 450 KC will work under the stated conditions. *A higher frequency will not permit ground wave propagation.*

For a second example, suppose we have a radiotelephone transmitter capable of radiating 1,000 watts on a fixed frequency of 2,000 KC and we wish to know the maximum communicating range from Island I, latitude 8° south, over sea-water to a receiving station on a ship. Good receiving conditions are known to exist on the ship. Figure 2 will indicate for night operation, a *required* signal strength of about 27.5 units (5.5 times the latitude factor of 5). Fig. 3 will indicate a working range of 63 miles (10.6 miles from the chart multiplied by the factor 6 noted at the bottom of the figure) under the stated conditions for a 50 watt transmitter. For our 1,000 watt solution we observe from 4, a means of obtaining our power factor; namely for a power ratio of 1,000 divided by 50, or 20, a factor 2.5,

Thus;

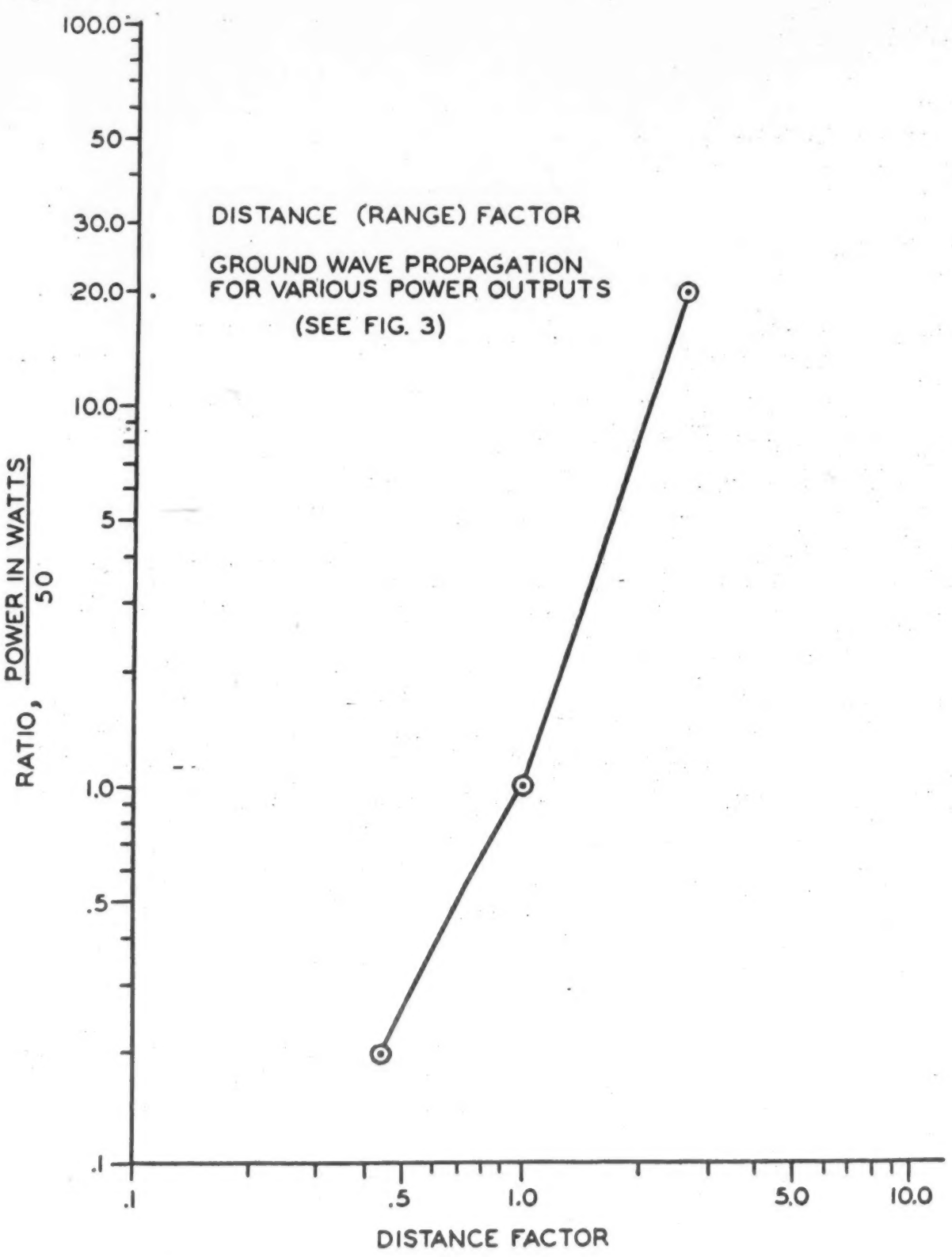
63 miles times 2.5 equals 157.5 miles—our final solution and our range.

One final observation of Figures 3 and 4 is in order. The curves were not plotted for signal strengths lower than 10 units for two reasons. A ten unit signal strength is about the minimum necessary for satisfactory radiotelephone operation, and furthermore, most military situations will predicate this level in order to override noise. Radio telegraph will usually give us ranges much greater than those indicated but, in any event, we may be certain of the calculated ranges being reliable under virtually any condition excepting *severe* atmospheric storms or *extreme* man-made interference.

So much for path Able.

Considering path Baker, this is the path we define when we say, "The line of sight path." This statement, the way we usually use it, is slightly

Fig. 4



in error since most of our VHF (very high frequency) transmission paths are in excess of the actual line of sight distance. If we wish to be approximately correct we will call this path the direct path and we will agree that this path will always work unless the ray is absorbed or reflected by something encountered along the path.

The preceding statement is not true! We admit this because some guardhouse lawyer may protest that he can stand on Hill 301 with a one-thousandth watt transmitter and not be heard on top of Old Baldy, the top of which is visible over yon, far horizon. For the last time, may we ask that our statements be considered in the light of everyday usage of common military items of equipment. From now on, if a statement is essentially correct, we will not deviate to explain the exceptions.

All right! We insist that the direct path, Baker, will always work unless the ray is absorbed or reflected by something encountered along the path. Would you believe it that a certain AN/TRC circuit in Western France skimmed along over the top of a dense forest; and would you believe it that this circuit became inoperative for a short time following dawn and for a short time before dusk; and would you believe it that this occurred every day and every day; the reason being that crows would fly back to their roosts during the evening thus interposing a very effective, absorbing screen for a few minutes! Perhaps this isn't a true story, but surely it is of reasonable basis!

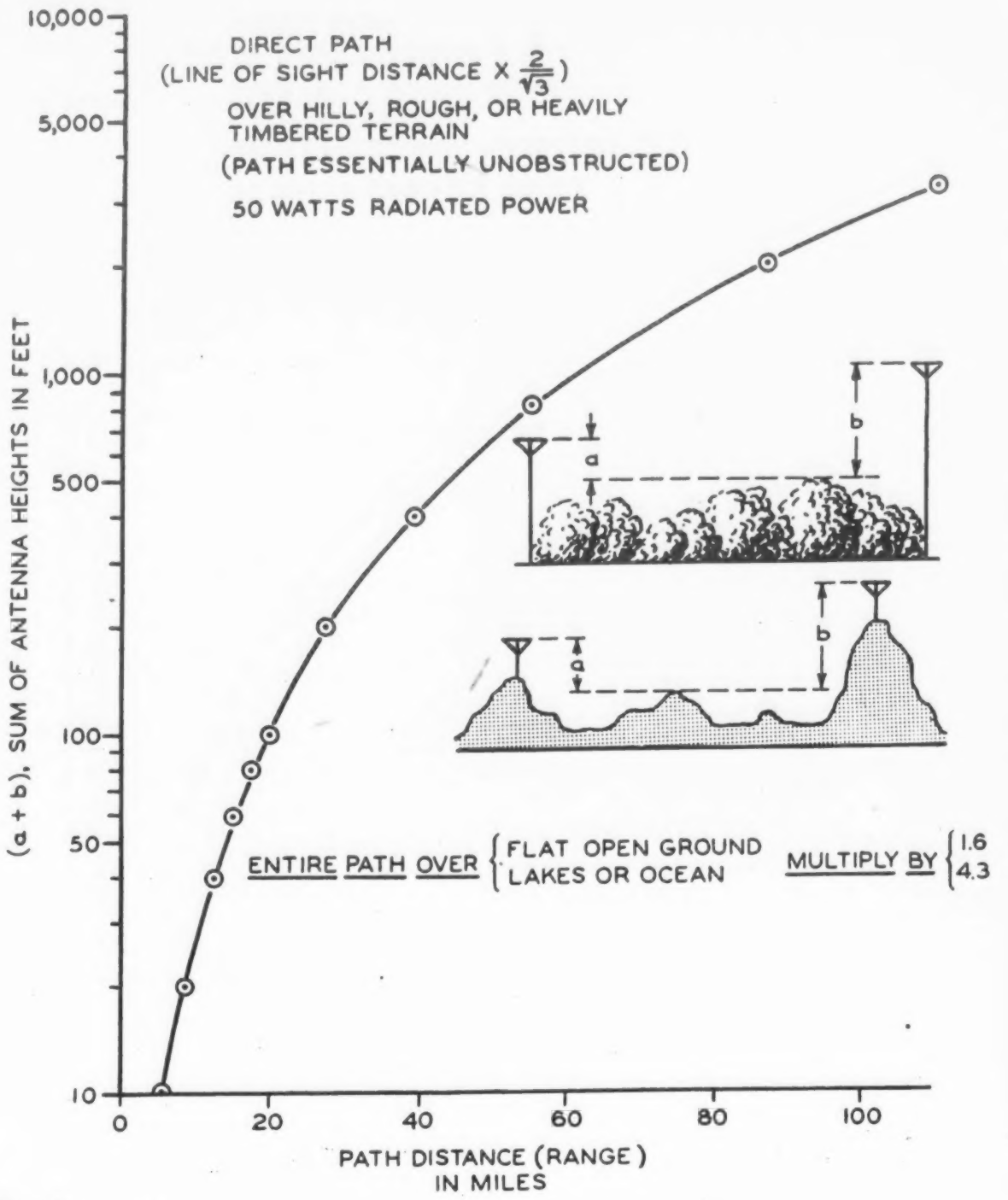


Fig. 5

On Reflection

If we are using very high frequency (VHF) we may be certain that objects the size of airplanes will reflect an appreciable amount of energy and for this reason we will endeavor to locate our terminals away from landing strips. If we cannot transmit through a hill, directly in front of us, we may be able to bounce enough energy off a mountain at the side of our path to contact the station on the other side of the hill. These are interesting observations but we must not lose sight of the basic premise that Baker must be an unobstructed "bee-line" from transmitter to receiver. Very confining, we agree; for we observe that even if we had unlimited power and two antenna poles *ten thousand* feet high for path Baker, we could only erect the poles 280 miles apart and maintain contact for, if installed a greater distance apart, the ground would "belly-up" and cut off the direct path and thus absorb the rays.

Another observation is that a VHF set with a short antenna in a row boat, drifting on a river, will be effectively out of sight, behind the curvature of the earth, to a similar set placed on a sand-bar, when the row-boat is approximately three miles downstream. Thus, antenna placement becomes, obviously, of vital concern in planning direct propagation. Figure 5 will give us more information than an elaborate written description. So, with a bow to Figure 5, we state that this diagram will answer all problems using path Baker. One must merely remember that the path must be—we repeat—must be unobstructed. If one is willing to gamble a bit, we will allow one to increase these distances by a factor of 1.6 for transmission over plains or meadows, and we will be most generous to the Navy and allow an increase in distance by a factor of 4.3 for direct propagation over salt water. This in effect permits one to transmit beyond the curvature of the earth under favorable conditions using path Baker. From the viewpoint of long distance communication, however, we admit that Baker is useless, and we remind one that Able is also useless for frequencies above 5 kilocycles. (*And to the die-hards of the kilocycle per second school, an acknowledgment that we know it—why don't you mind your own business!*)

Here's Charlie

Now that we have decided that both Able and Baker are virtually useless for military field usage over appreciable distances, we come to that most brilliant performer, that old ace in the hole, that erratic *!æ*? Charlie!

Path Charlie is known as sky wave propagation. If one wishes to determine if Charlie will work, one must calculate a baker's dozen of factors, any one of which may prevent the sky wave path from working! Here, however, we propose to blithely disregard a host of things and give the simple data on sky wave propagation and gamble that we will be right 85 per cent of the time! Before we con-

sider the omnipotent diagrams, we shall need a few concepts of the path.

Wild "Something" Yonder

To travel from X to Y by path Charlie, it should be noted that the path leaves the transmitting site and arrives at the receiving site at the same vertical angle. It should also be observed that the ray is bent back to earth at the middle of the path. These are the two fundamentals. If the ray does not leave the transmitting site at the correct angle and if our receiving antenna is not receptive to waves arriving at the correct angle, transmission is nil or inferior. If "something" doesn't bend the ray back to earth we cannot use the path. It now should be manifest that we must use the correct frequency; that our transmitting antennas should have the ability of "squirting" all of our power in the direction of the receiving station *at* the optimum vertical angle; that our receiving antennas should have maximum response in the desired azimuth and at the desired vertical angle, and, if possible, the additional ability to reject all signals arriving from other directions or vertical angles. These elements are subject to design or selection. The one thing in the hands of chance (or prediction) is the "something" which effects the return of the radio wave to earth.

In the outer atmospheric shell of the earth we have the same physical conditions existing as are found in fluorescent lamps and neon signs. The condition of a near vacuum with the presence of small amounts of gaseous elements exists in both the tubes and the outer atmosphere. And, for the record, I would like to be the first to predict some enterprising advertising agent's spectacular sign for "Sziltch's Beer" being projected in the sky in flaming letters two thousand miles in width, visible from Bombay to the Top of the Mark, for when this rarefied atmosphere is subjected to a high electrical potential, it may be made to glow like a baboon's behind in a bright light. If it is subjected to energy bombardment from outer space (from the sun) it will also glow, creating the northern lights, or it may, at lower intensities, actually not glow but merely bend certain radio waves back to earth.

HF Hard to Reflect

One fact we must accept; the more severe the bombardment the more the bending. Thus at noon of a given day we find the maximum bombardment of energy from the sun striking the atmosphere directly above us and we expect certain high radio frequencies to be reflected back to earth; frequencies *which will not be reflected back to earth at midnight of the same day*. Since experience will indicate that a highly active entity is harder to deflect from a straight line than a slow, languid entity we may suppose that the higher frequencies will be harder to deflect by the ionosphere, and so it is.

Daily & Seasonal Cycles

The ionosphere, by the way, is the name given to the outer atmospheric shell responsible for deflecting the radio waves back to earth. The ionosphere at noon will bend back much higher frequencies than it will at night and, by reason of the sun being the prime mover of the ionosphere's reflecting power, it should be evident that there will be a difference in the degree of bending, contrasting winter with summer as well as day with night. A marked difference is also observed between periods of sun spot maximums and sun spot minimums.

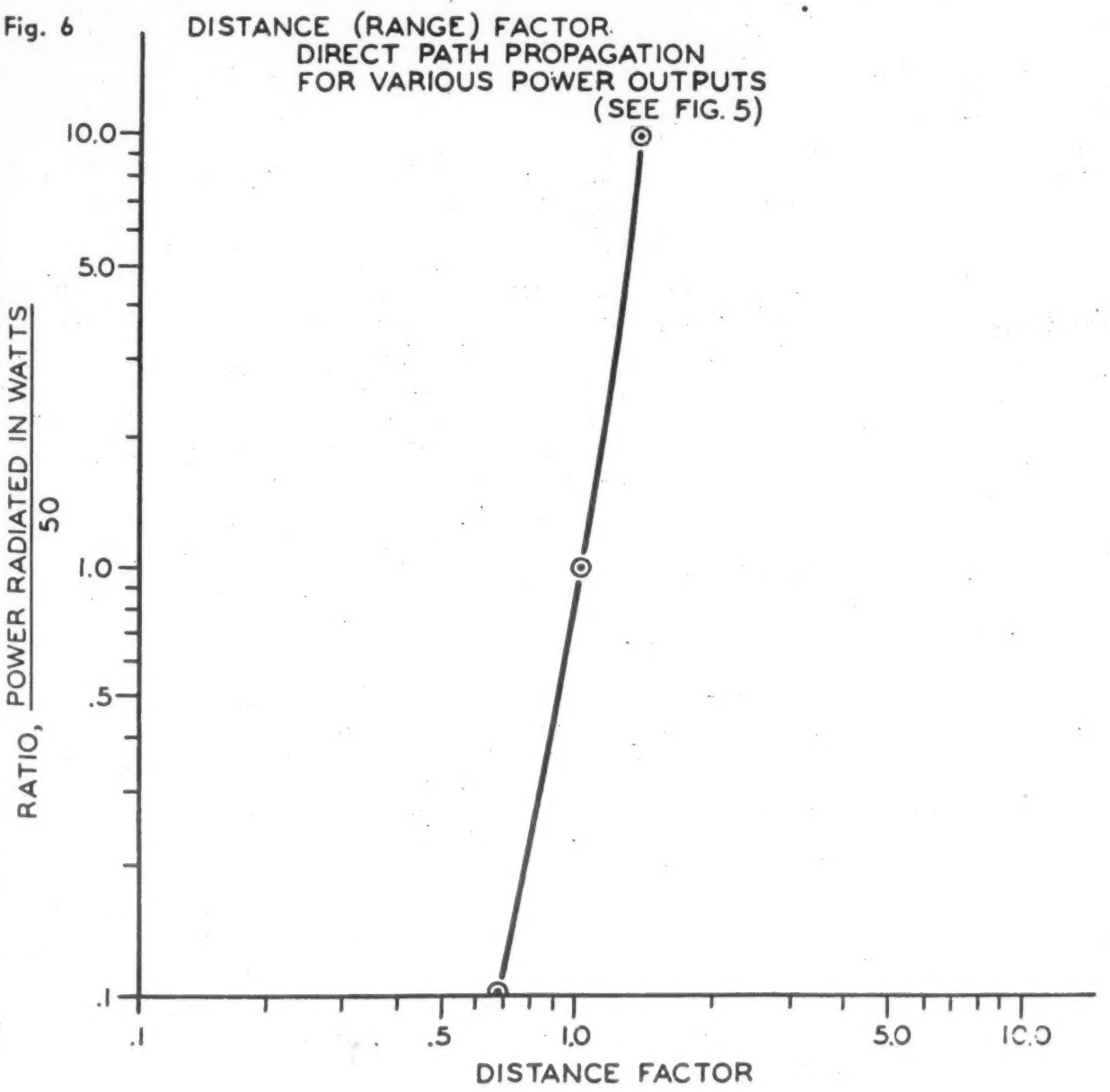
All of this may be consolidated into an idea of daily, seasonal, and yearly variations, repeating in cycles, which are most certainly predictable providing we have observed the behavior of the ionosphere long enough to collect the necessary prediction data. The Radio Propagation Unit working under the direction of the Chief Signal Officer and the Central Radio Propagation Laboratory of the National Bureau of Standards are two agencies who have been interested in this work for many years. In brief, in war or peace, someone published the information necessary for basic radio propagation predictions.

If an accurate prediction is desired, up to three months in advance, the CRPL Series D predictions may be obtained from the National Bureau of Standards or from the Department of the Army, Navy, or Air Force and the problem may be calculated quite easily. If one is merely interested in rule-of-the-thumb prediction, may we "sell" Figures 7 and 8. These figures should be fairly accurate for the distances shown in the northern hemisphere at a latitude of from 30 to 50 degrees for the period of the next two years.

The information in Figures 7 and 8 should be self-evident.

Actually the frequencies given in Figure 8 are average optimum working frequencies and are the best, average selections (not forgetting the more accurate and calculable CRPL Series D results) regardless of our transmitter power, our receiver sensitivity, or the type of service—telephone, code, teletypewriter, etc.

Fig. 6



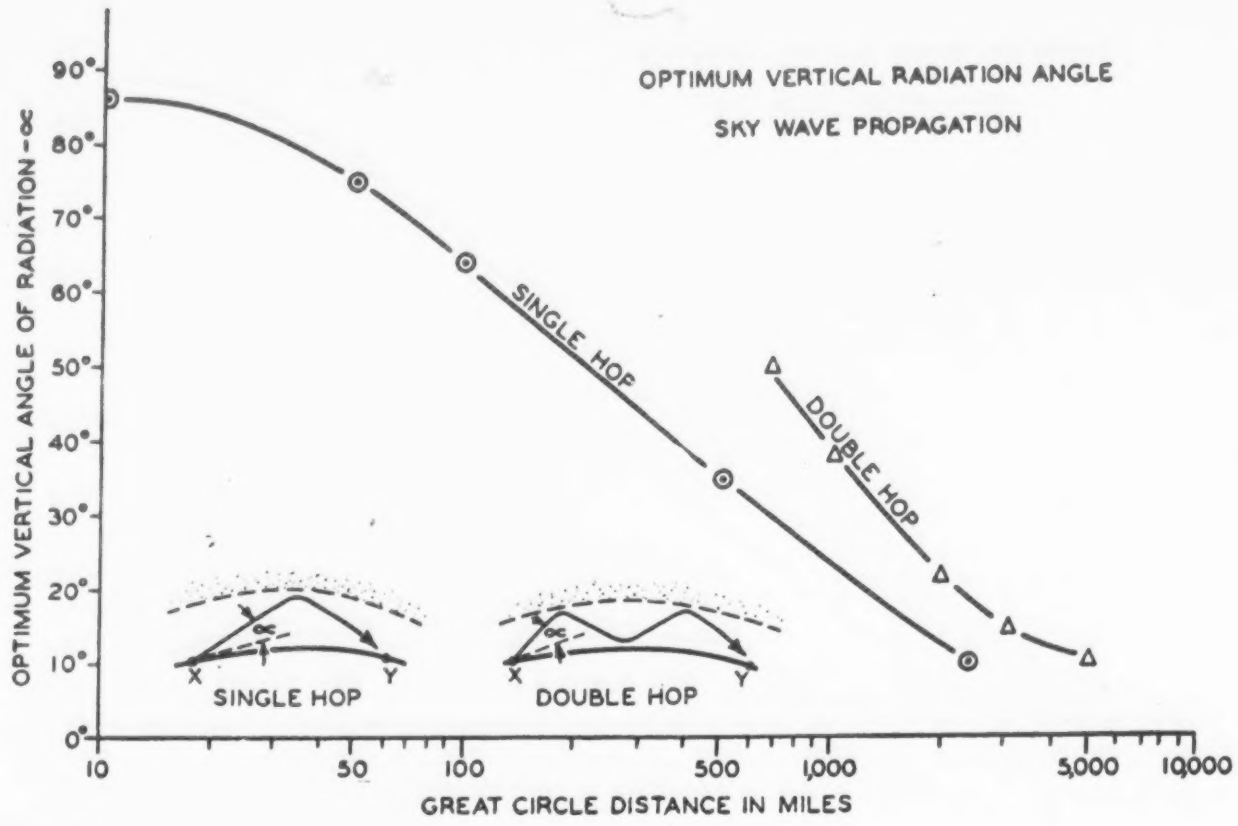


Fig. 7

If this graph is followed there will be obtained the best results possible. (Even so, the circuit may not be workable due to other factors!)

Actually there are sporadic periods when ionospheric storms, atmospheric or man-made noise, and/or absorption will absolutely prevent sky wave communication. Nevertheless, we insist these rough predictions *are very much better than a guess* and should serve as a guide in deciding if an unsatisfactory frequency is too high or too low. *For the purposes of this article we will agree that the maximum value of frequency we may use is only ten per cent higher than the optimum frequency shown in Figure 8.*

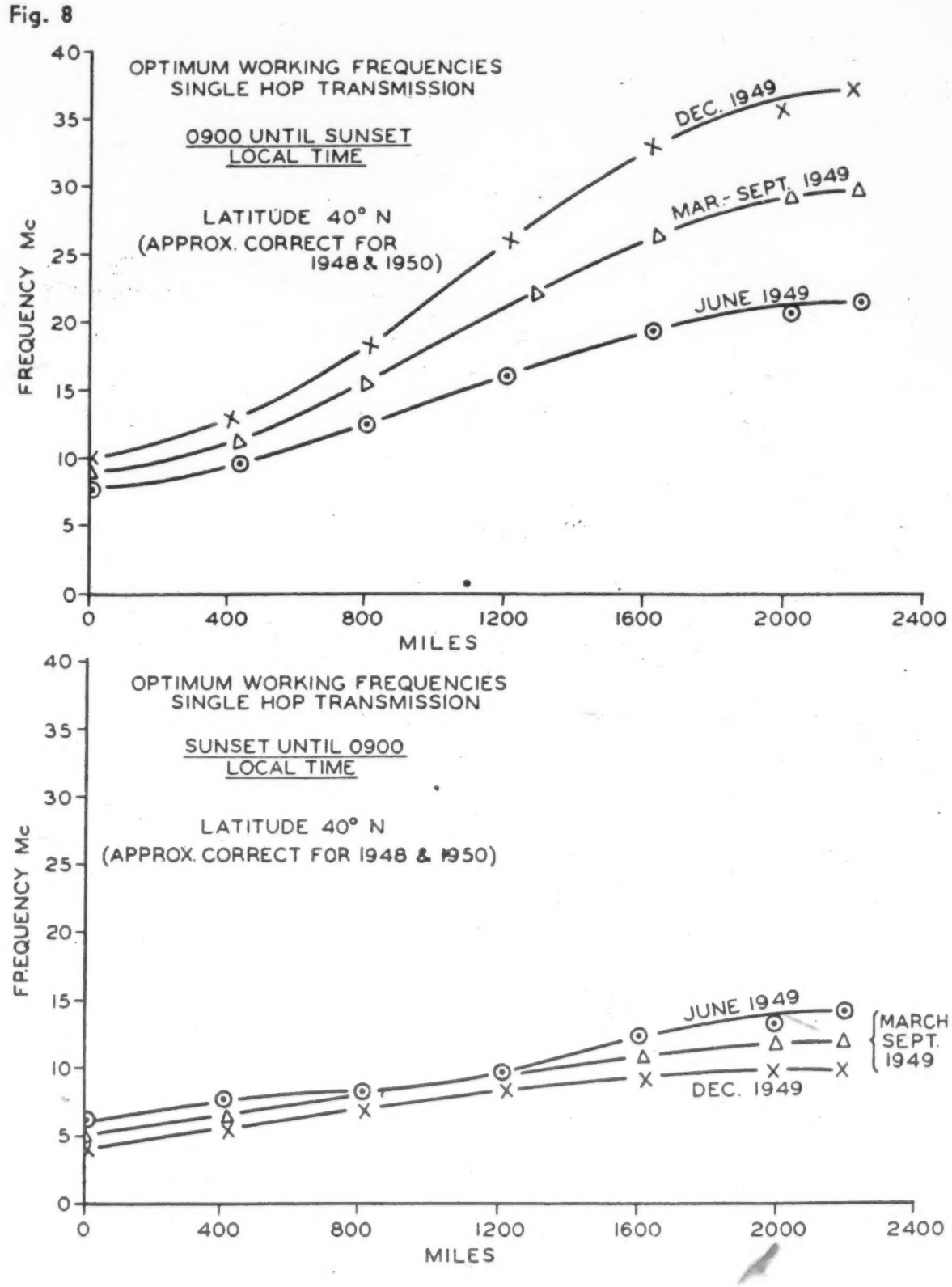
In other words, we must look with a jaundiced eye at frequencies higher than the optimum frequency before we decide to shift to a higher frequency. We will be most quick to change to a higher frequency, though, in the event our unsatisfactory frequency is lower than the optimum. To be doubly certain that we are not misunderstood may we say this again in this way, "Stay as close to the optimum working frequency as possible, realizing that one can go either too far above or too far below for satisfactory operation, and realizing that one usually cannot go much higher than optimum but *quite often* one may go an appreciable degree lower." One, in addition, should remember the following important rules regarding use of sky wave propagation:

(a) Sky wave propagation is questionable or useless below 3,000 kilocycles during daylight hours.

(b) For the next few years sky wave propagation will normally be nonexistent above 25,000 kilocycles during summer daylight hours and above 40,000 kilocycles during winter daylight hours. (Maximum night frequencies, are as explained before, much lower.)

(c) Never use sky wave propagation if ground wave or direct path propagation will work.

Fig. 8



. The remainder of this article will consist of a brief discussion of radio antennas. We would like to drum up an avid appreciation of antennas and we would like to present some practical and assimilable data. This data will not be of interest to those who have a sound, operational knowledge of antenna theory since all of the information expounded in this article may be found in the usual handbooks. The form of presentation and the emphasis upon certain elements may be, however, somewhat different than that of the usual treatise.

Antenna Design Neglected

The radio antenna is often considered to be part of a radio set. We could be wrong . . . the matter seems to be one of relativity . . . but we are much inclined to feel that the antenna is infinitely more important than the radio set. Our observation is that the design engineer's interest comes to an abrupt end at the antenna terminals. He snubs the antenna with the

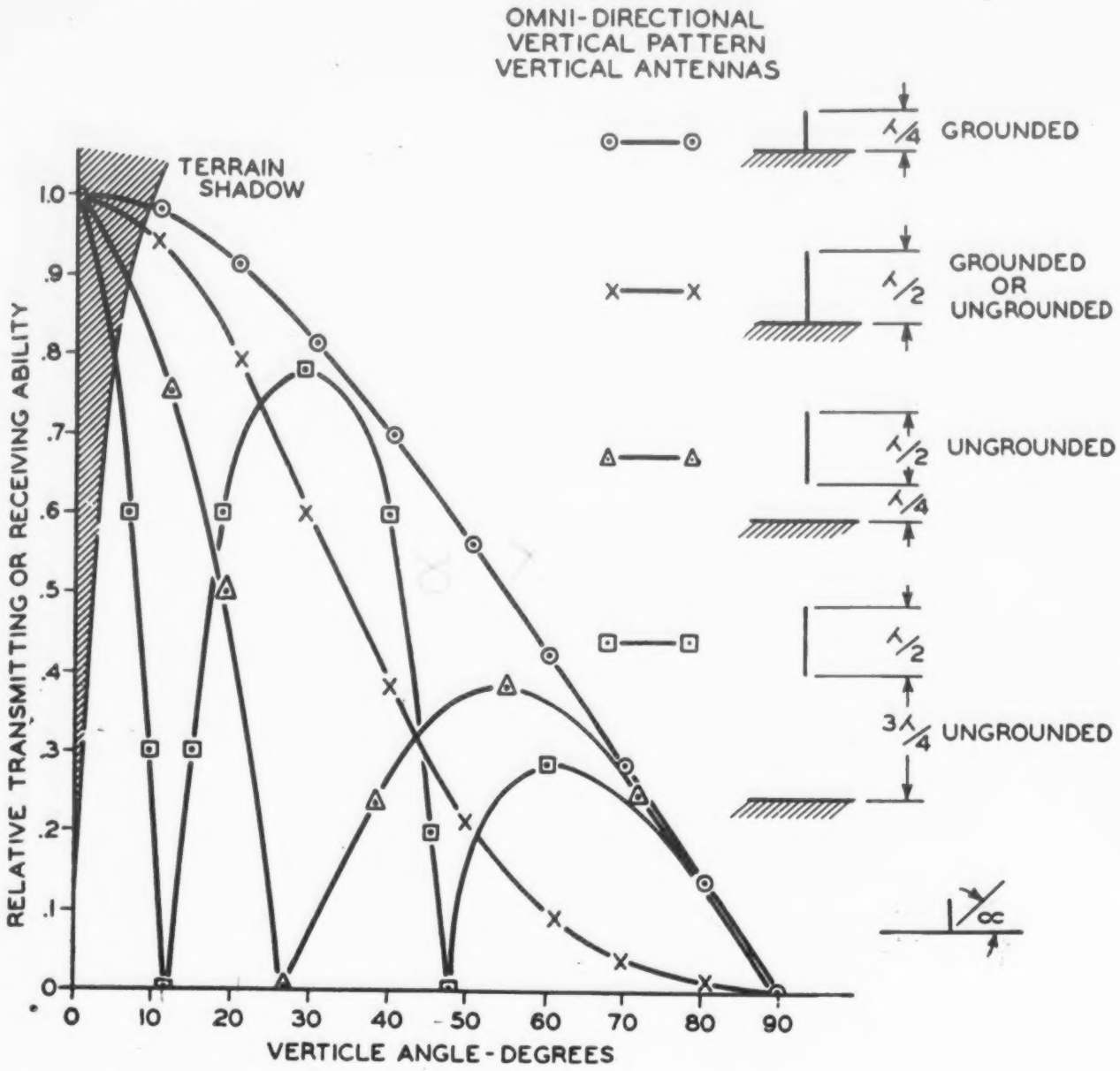


Fig. 9

verve of a Long Island matron fluffing off the country cousin from Four Forks.

Tucked away in a certain radio handbook we find the bland statement, "Commercial radio antennas are designed to exhibit as much as 22 db gain." This statement might be easily passed over without one appreciating the magnitude of a 22 decibel gain. This is a power gain of 158. This is *terocious* and don't bother to look up the word—it is one of our own coining and should extend the usable, upper limits of Hollywood's adjectival spectrum! Given a 40 kilowatt transmitter, exciting an antenna designed to exhibit a power gain of 22 decibels, the transmitter appears to have an output of 6,320 kilowatts viewed from the receiving end of the path! This same degree of gain *may also* be incorporated into the receiving antenna, thus bringing electrocution by remote control within the realm of possibility! The startling feature of this power increase appears when we state that it may be accomplished with virtually nothing more than some wire, a few poles, and a few insulators. Perhaps, before we allow our public relation complex to hypnotize our customers, it will be advisable to define the limits of this utopia. It shall be necessary, first, to define one basic premise.

The half wavelength antenna is fundamental. The simplest antenna is a half-wave antenna, though like Aesop with the camel, we may not always observe the whole of the beast. Physically, we may not see a half wavelength in a short whip antenna, but we may be certain that the entire half wavelength is there, either coiled up electrically into a loading inductance, or partly supplied by some ground connection hokuspocus called "the image."

Half-wave Formula

This isn't too important to us except from one angle. We correctly state that electrically our antenna must consist of one or more half wavelengths; the more the better. We may string these half-wave elements end to end or we may arrange them in some sort of a fancy bird-cage with the same thought in mind; the more the better. The thing to give us pause is the physical length of this half wavelength along a wire suspended above the earth in the usual fashion for antennas. A good, approximate formula for the length of the half-wave, along a wire, in feet, is 468 divided by the frequency in megacycles.

As an example, the shortest wire length for an antenna, not connected to ground, that will operate on 1,000 kilocycles (1 megacycle) is 468/1 or 468 feet and, although a small pasture will accommodate this antenna, it would look a bit silly mounted on a jeep . . . so what do we do if we wish to operate at this frequency in a jeep? We simply wind most of the antenna into a coil, a fifteen foot end protruding electrically, and we call it a whip antenna. The fact that we have lost most of the radiating efficiency in the process and are requiring a small boy to do a man's work is blithely ignored. We end up with a thousand dollar radio working through a ten-cent antenna . . . at best a compromise and maybe an admission that we have been neglecting antenna research for research on more complicated equipments.

For the Happy Medium

Perhaps if we would spend a little more effort in developing radiators of increased efficiency we could expect increased reliability with smaller sets. We admit we could possibly carry this idea to the extreme where we would be using a ten-cent radio with a thousand dollar antenna. We contend this also would be stupid; somewhere there is a reasonable balance between the two factors. We are way to the left of center at the present date.

The one basic premise we set out to define in the paragraph above is rather effectively screened by a bit of propaganda. The premise is, actually, the appreciation of the size of antenna half wave elements. With present day techniques, antenna arrays with sizable gains may be constructed for little cost in a limited space using very high, ultra high, and super high frequencies by reason of the physical dimensions of the half wave falling between the limits of fifteen feet and a fraction of an inch for these frequencies. An extreme case would be the consideration of the size of a half wave for 30 kilocycles (.03 megacycles). For this frequency the length of the simple antenna would be 15,600 feet and dimensions alone would make the construction of an array of many of these half-wave elements a project of Herculean proportions. A further appreciation of the basic half-wave antenna predicates that the entire half wavelength should be electrically exposed if we are to expect good radiating efficiency; we must not expect good results if we resort to electrical tricks to utilize a physical length of antenna which is only a fraction of a half wave in length.

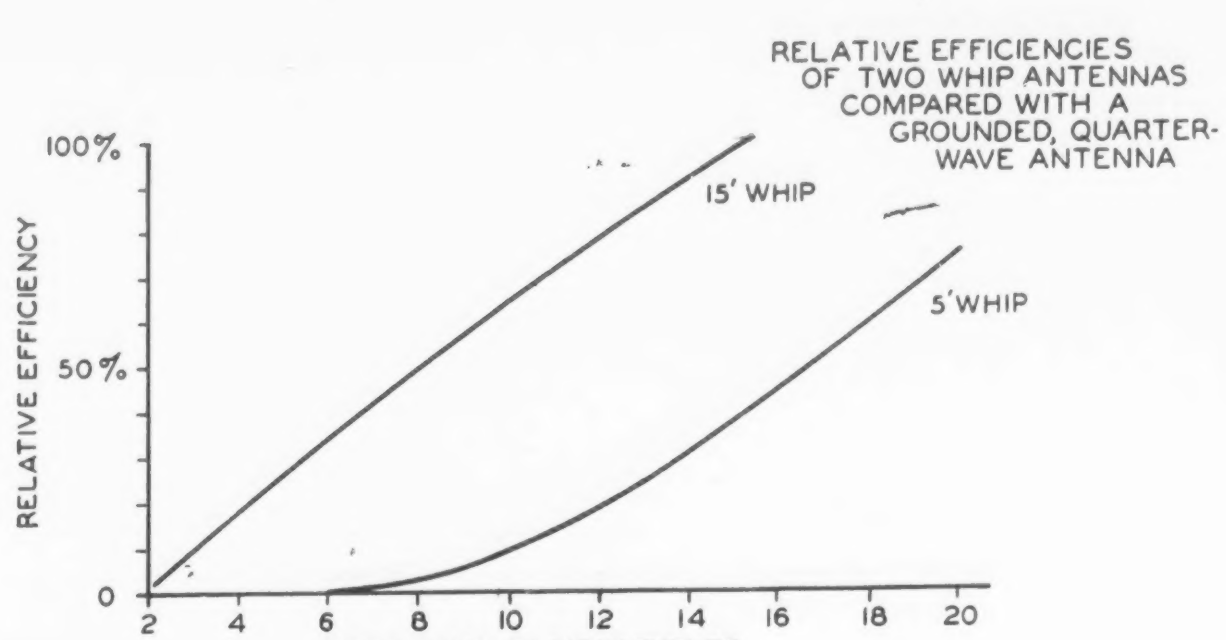


Fig. 10

Now that we have presented a bit of sales talk on antennas, may we discuss their usage.

Many military situations, especially those of mobile operation, require the use of short antennas with omni-directional characteristics. In other words, we desire 360 degree azimuthal coverage from our transmitting site and the ability to receive signals from any direction with the same degree of efficiency. To accomplish this we usually select a single, vertical radiator such as a whip, a tower, or a vertical wire. Of course, we should realize that with this ability to transmit or receive equally well in all directions we sacrifice the opportunity to beam or concentrate all of our radiation in a desired direction. It is in those situations wherein we only need to transmit in a given direction that we goof off with lackadaisical operation using omni-directional antennas when we actually have the time and the materials to construct a directional antenna.

Whip Limitations

We also expect our whip antenna to accomplish many things without one thought of its limitations. We operate it at the lower end of the high frequency band and wonder why we do not get better results. As previously explained, all of the antenna isn't in sight. Only part of it is radiating and the greater portion of our available energy is wasted in heating up the set or the ground. Please look at Figure 10. We also may be surprised to learn that the vertical antenna is useful for only low or even *very* low angles of radiation. A review of Figure 7 and a quick glance at Figure 9 will clarify this entire consideration.

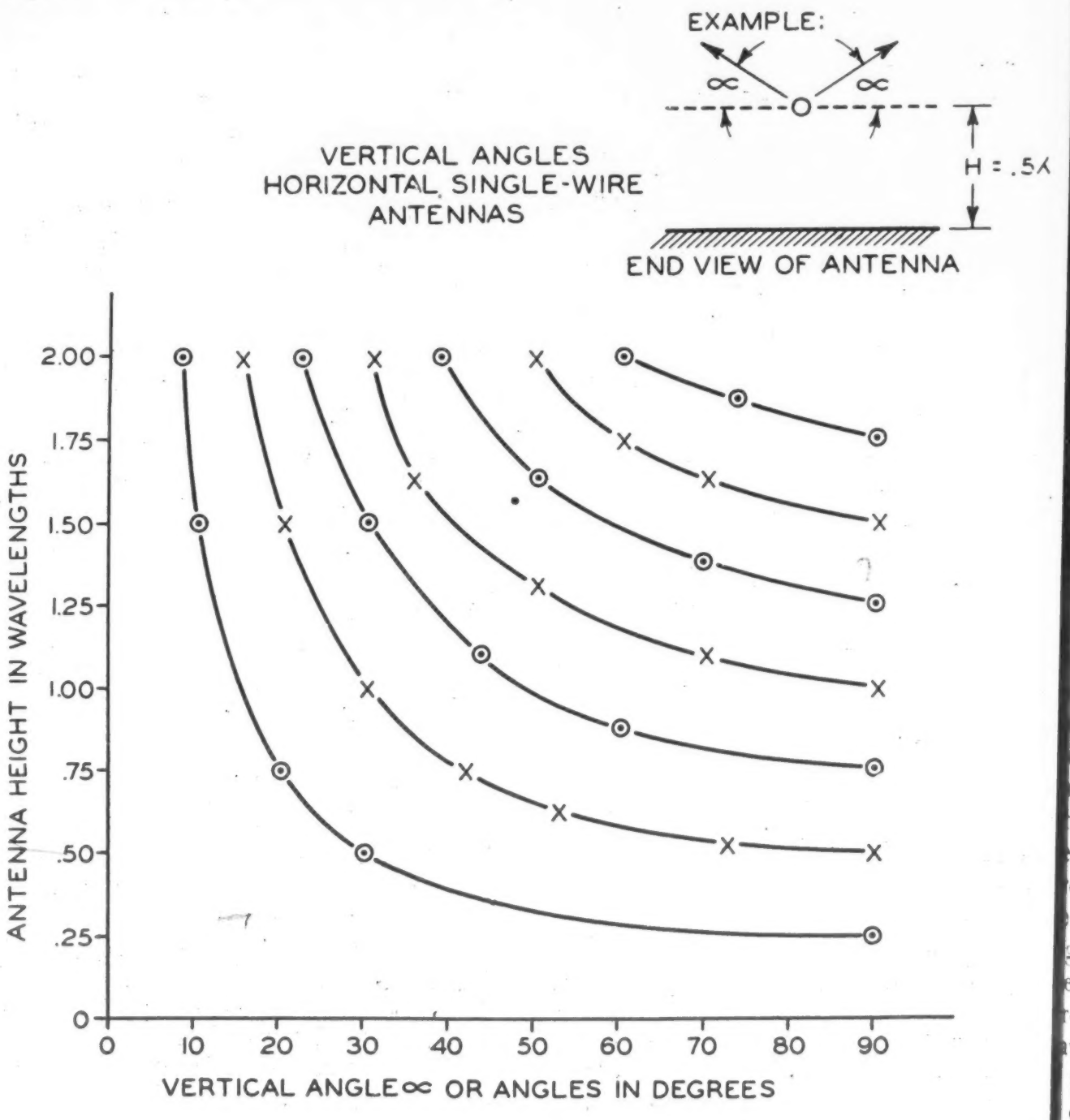
We note that a vertical half-wave antenna does not radiate well at vertical angles greater than forty degrees. *We must never disregard the low radiation (or reception) angle of a vertical antenna; yet we do!* From Figure 7 we note the optimum vertical angle is about 75° for sky wave transmission over a fifty mile path, such as a jungle path wherein we have complete absorption of the ground and direct waves. We now suspect that a vertical antenna will be worthless for this application and we are correct. Figures 9 and 10 furnish us with factual data relative to the vertical angle efficiencies of vertical half-wave antennas and vertical fractional-wave whips. This information, plus that of Figure 7, should take us a long way toward solution of sky wave propagation problems using vertical grounded and ungrounded antennas.

For ground or direct wave propagation we may assume that our best vertical angle of propagation is zero and Figures 3, 6, and 9 will yield essential data to those who wish to carefully study and evaluate the information. In general, vertical antennas are useful for ground wave, most direct wave, and long-distance sky wave paths; verticals are usually unsatisfactory for short and medium distance sky wave paths.

Polarization Tricks

At this point polarization rears its ugly head and its importance should be recognized. A rather spectacular demonstration of the importance of polarization may be performed with two half-wave antennas of the same length. When one is excited at its

Fig. 11



natural or resonant frequency as a transmitting antenna and the other has a small light bulb inserted in the center of the antenna, thus becoming a receiving antenna, we find, when the latter is brought into proximity with the transmitting antenna that the light bulb will glow brightly when the antennas are parallel, but the light bulb will not glow when the antennas are at right angles to each other. no matter where in space we place either or both of them. This demonstration is impressive and, once observed, will probably prevent one from making the mistake of using a vertical antenna at one end of a path and a horizontal antenna at the other. Please remember, transmitting and receiving antennas should always be parallel to each other—long distance. multi-hop transmission engineers disregard this statement; consult the nearest soothsayer holding a valid union card.

Reciprocity

When antennas are operated in proximity with the ground, say within a ten wavelength distance we observe a change in the vertical angle of radiation with a change in the height above ground due to an image effect. This applies to all antennas, grounded or ungrounded. Incidentally, we repeat the statement that, at a given frequency, if an antenna has one or more peculiar characteristics for transmitting, it has exactly the same characteristics for receiving . . and vice versa. This is the important reciprocity theorem and is a very helpful tool in analyzing antenna phenomena.

We mention the image effect of the ground on an antenna although this actually has nothing to do with usage of antennas; it is rather one of the basic principles. Whenever we physically ground an antenna or whenever an antenna is near the ground there appears to be, from all points of observation above the ground, a mirror image of the antenna in the ground. For example if we erect a vertical one-quarter wavelength antenna above the ground and physically connect the bottom of the antenna to ground, from all points in space we observe another quarter wave extending into the ground from the end of the actual antenna. These two quarter-waves form, in effect, a one-half wave-length antenna. The advantage of this connection is the opportunity to operate a short length of antenna at a frequency exactly one half of normal, resonant or natural frequency. The disadvantage of this connection is the appreciable increase in absorption losses noted when we place an antenna, particularly a transmitting antenna, in close proximity to the earth.

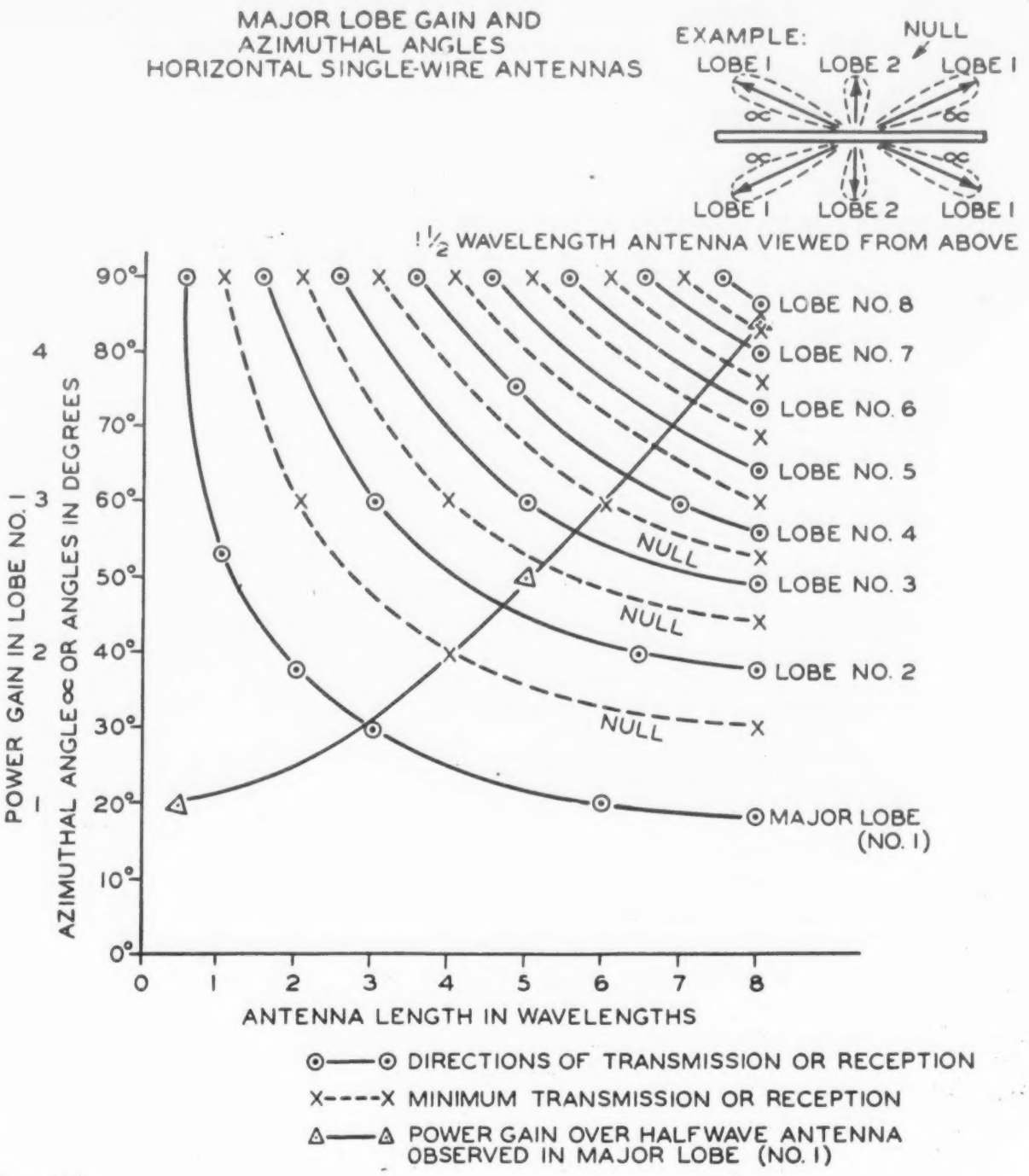


Fig. 12

Horizontal Misuse

Horizontal antennas are probably the most misused element in radio communication. In the first place they are virtually worthless for ground wave propagation. Why? . . Because a horizontal antenna is horizontally polarized, meaning that it operates only with horizontally polarized waves and *the earth short circuits a horizontally polarized wave when the wave attempts to travel along the earth.* To those who object, we defend this statement as being true within the limits of efficient communication practices.

Horizontal antennas have very definite azimuthal directions and very definite vertical angles in which they do and do not operate, no matter whether used for transmitting or receiving. The azimuthal directions with respect to the antenna depend upon the length of the single wire antenna or upon the number and configuration of the several antennas in an array. *The azimuthal direction normally is not influenced by the height above ground. The height above ground is, nevertheless, the normal, governing factor in defining the vertical angle or angles.* We cannot discuss antenna arrays in this article but we invite attention to Figures 11 and 12. We have attempted to extract the germ from the whole treatise of single wire antennas and present the information in a useful form to one who may wish to operate correctly without knowing the full reason why. If one does not limit the operation of horizontal antennas by these general rules, or, should we bluntly say, if one attempts to operate without knowing what one is doing, the results will have a fifty per cent chance of being lousy.

With apologies for the liberties and short-cuts taken in this article, we sincerely hope that we have prepared a brief, usable handbook in the form of the encompassed figures and graphs. We sincerely believe that careful evaluation of the graphs will accomplish much more than all the yakety-yak we have written on this paper.

EDITORIAL

Messages to the AFCA

From President Fred Lack

And Past President David Sarnoff

The Armed Forces Communications Association is coming of age. We now have 6,000 individual members and subscribers, 138 group members, and 34 Chapters. This should form a sound nucleus from which to build a strong affiliation of American citizens dedicated to keeping alive in this country an interest in and a knowledge of the design, production, maintenance, and operation of military communication, electronic, and photographic equipment.

Local chapters form the basic structure of our Association, their activities serving to preserve and foster the spirit of fellowship which comes from having served in a common cause. As a secondary means of keeping the membership informed, the Association publishes this magazine, the only publication of its kind devoted to the military aspects of communications and photography.

Although concerned initially with the Department of the Army, our Association has rapidly expanded its scope to include Air Force and Navy communications and photography. A concrete example of the all inclusive aspects of our activities is the recent annual meeting in Washington where our host, the Navy, gave us an extremely interesting and challenging picture of their operations and needs in our field of technology.

If he is worth his salt, a man by the time he reaches maturity has established for himself his ideals and ambitions and has developed a philosophy of life. His success or failure is then a matter of the soundness of his choice of objectives and the energy with which he goes after them.

Likewise, the Armed Forces Communications Association, now attaining maturity, must explore and reaffirm its ambitions and purpose and develop a sound philosophy of action which will insure the successful attainment of the goal of its founders—a strong civil-military team seasoned by the experience of one conflict which during peacetime continually examines the nation's defense planning in the light of that experience so that it can function as a powerful integrated unit should any future emergency arise.

The coming year is a year of decision for our Association. May we plan wisely.

F Rack

When the Armed Forces Communications Association was formed in 1946, one of its main purposes was to assist in maintaining closer relations between civilian scientists, engineers, manufacturers and those concerned with similar activities in all branches of the Armed Forces. It was recognized that national security and industrial preparedness require continual liaison and cooperation between the armed services and industry. A "coordinated approach" in scientific research was seen as vitally necessary even in peacetime.

Four years have passed since the war ended. Nevertheless, events since that time reveal that we must not slacken in our efforts toward coordination in all phases of communications, electronics, motion pictures and photography, as well as in research. Atomic energy, electrical power, instant communication, winged transportation, radio, television, motor cars and a host of other dynamic manifestations of life have basically changed human environment. Much of humanity finds its surroundings confusing, and is unable to adjust itself to the rapid changes.

Viewed in the light of continuing tension in world affairs, the problems of modern society show that mankind is living in dangerous ignorance of itself. Largely because of this ignorance, a world that might have peace and plenty and happier and wiser inhabitants is threatened by violence, hunger, and desolation.

The time has come in the life of mankind for a penetrating study of man himself—employing and coordinating every new force at his command in the realm of the physical as well as the social sciences, to learn what makes man "tick."

There is grave need for a new type of scientific worker or, to be exact, groups of workers and associates, to conduct as their supreme quest—the study of man. These scientists should be highly skilled experts capable of carrying out original research in their individual branches of knowledge. But they also must be well-informed and capable of understanding the techniques, methods, and data of allied fields. They should be able to apply the knowledge of their own specialized fields to the other branches of science.

New tools, including electronics and atomic energy which science continues to make available put us on the threshold of new opportunities. Likewise, they impose upon us great obligations to use them constructively. The hour has come to bring their vast potential benefits to humanity through concerted and systematic research for the development of man himself. Only through such coordinated scientific efforts can man be assured of his survival in this Atomic Age and of the full use of his God-given powers to progress, to live in peace, and to fulfill his destiny.

Dav Sarnoff

PHOTOS—

Activities of the Army Pictorial Service, Division of the Office of the Chief Signal Officer

Right: The Sixth Army film library, Presidio of San Francisco, is one of the worldwide chain of libraries which are recipients of the millions of feet of training film produced yearly at the Signal Corps Photographic Center, Long Island City, New York.

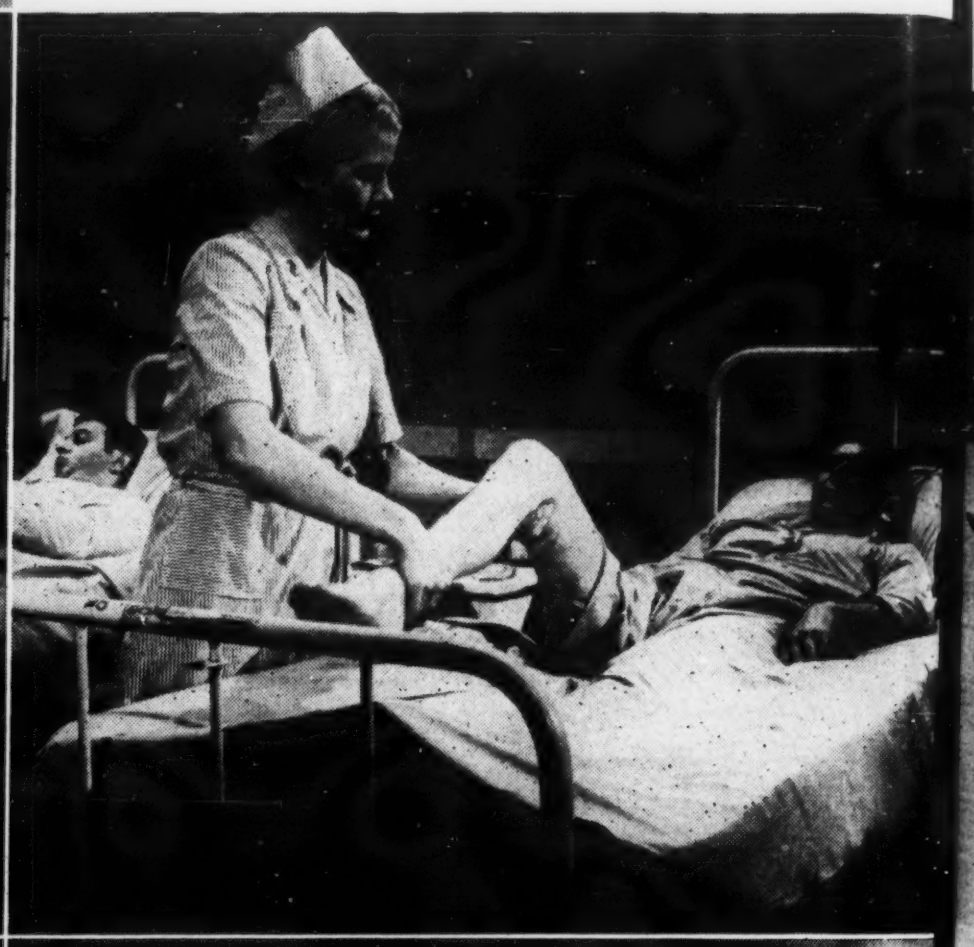
Below: An animation camera photographs a title board for a training film at the Training Film Laboratory, Fort Monmouth, New Jersey.

The Photographic Center and the Training Film Laboratory will be among the Signal Corps installations open to AFCA visitors at the national meeting in New York next spring.

Army Pictorial Service Films - - - - - -

Right: The Army Pictorial Service wins another "Oscar." Examining the Oscar, awarded for the documentary film "Toward Independence," are Dr. Edward M. Gunn, Army Institute of Pathology; Col. Emma E. Vogen, MED; Maj. Gen. Raymond W. Bliss, Surgeon General; and Maj. Gen. Spencer B. Akin, the Chief Signal Officer.

Below are scenes from the film, and during the filming recording the long fight of paraplegics toward rehabilitation and independence.



- - - - - - Training and Documentary

Scenes from the Army Pictorial Training film "Communications In The Infantry Division." The subjects in the film are the Second Division Signal Company, stationed at Fort Lewis, Washington.

Units in formation are radio and telephone platoons, division liaison net, division administrative net, and division command net. Activities portrayed are the telephone and teletypewriter switchboard tent, a signal wire laying team and a switchboard team.

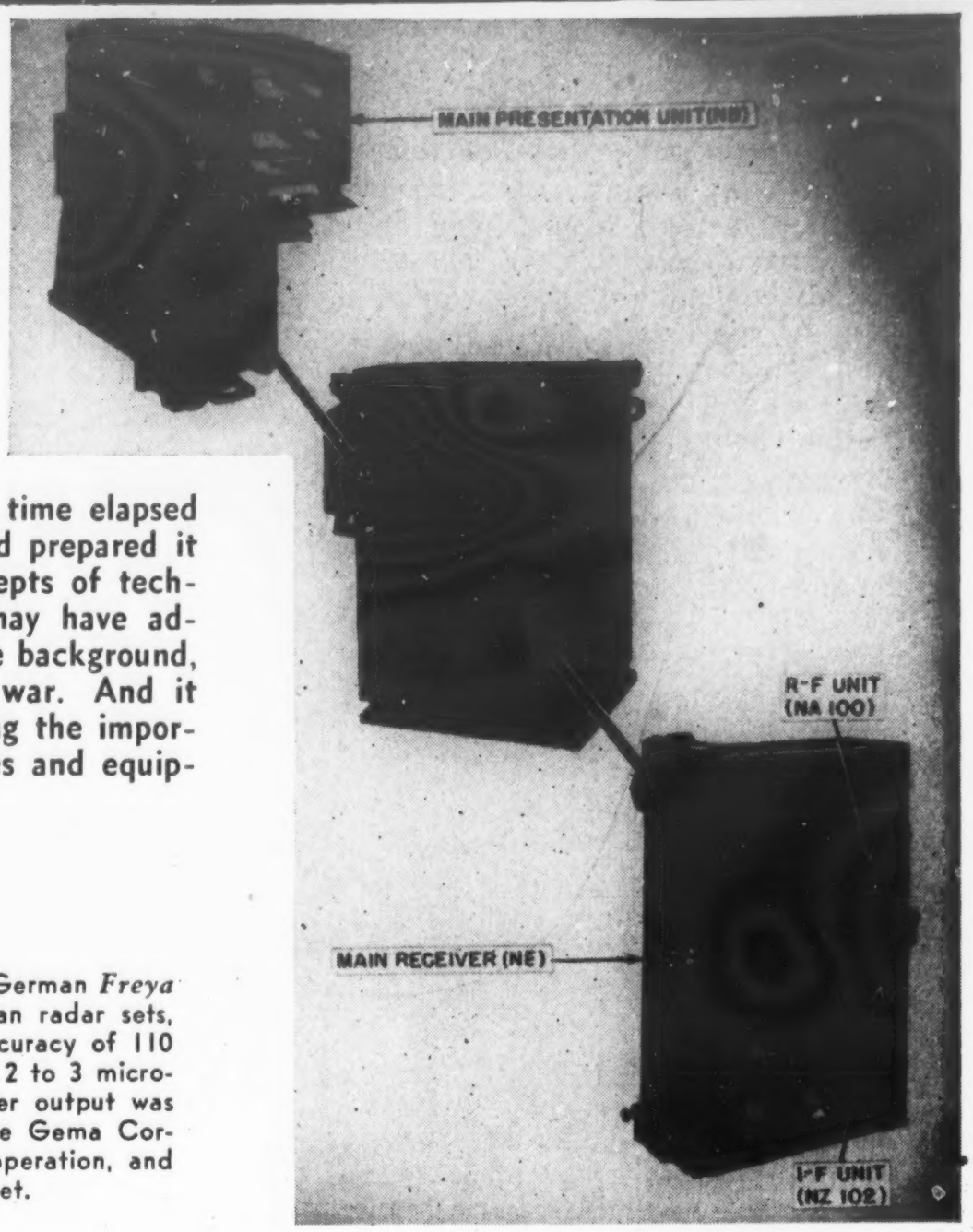
- - - and Stills

Principal still photographic activity of the Army Pictorial Service is in the Pentagon, Washington, D. C. The still picture library there contains more than a half-million subjects, a collection which began with Matthew Brady's Civil War photographs, was added to enormously with the intense coverage of World Wars I and II, and yet goes on.

Pictured on this page are sections of the Signal Corps Photographic Laboratory in the Pentagon. The stills printed here constitute a large proportion of all Signal Corps prints made—far more than the printing accomplished at any other one Signal Corps photographic center.

At the Pentagon the Army Pictorial Service also maintains and operates a well equipped laboratory for the processing of color separations, transparencies, and prints.

Ed. Note: The vast advancement of science in the second World War brought with it an equally radical change in military technical intelligence concepts. During the post war period the Signal Corps, with an eye to the lessons of the recent war, have been planning for technical intelligence units and facilities that would adequately meet possible future requirements. In the efforts to set up a program of high efficiency the planning of course has been continuous, with the resultant constant change and expansion in the thinking in this field. Even in the comparatively short time elapsed since SIGNALS received the manuscript for this article and prepared it for publication there have been important changes in concepts of technical intelligence requirements. But while the concepts may have advanced beyond this article there is still within it much of the background, the history, of technical intelligence activities during the war. And it sets forth the general trend of present planning, emphasizing the importance of early evaluation of an enemy's scientific techniques and equipment.



Photo, right, shows the receiver and main presentation unit for the German *Freya* early warning radar. This equipment, one of four standard German radar sets, weighed 6.8 tons and had a range of up to 150 miles with an accuracy of 110 yards in range and less than 1° in azimuth. Pulse length was from 2 to 3 microseconds and pulse recurrence frequency was 500 c.p.s. Peak power output was 20 kw. This particular set was developed and manufactured by the Gema Corporation. It required a very complex antenna array for efficient operation, and the set had to be sited at elevations of at least 200 feet.

TECHNICAL INTELLIGENCE AND THE SIGNAL CORPS

By Major Franklin M. Davis, Jr.

Cavalry, USA

The military developments for future warfare, already close to a level where most of World War II's best weapons are obsolete, have created a unique time displacement which cannot be defined in the strict, or conventional, terms of a strong national security program. Heretofore the conception was held that a well-trained Regular Army augmented by civilian soldiers and our national capacity for industrial production was enough to defeat any enemy. This automatically assumed sufficient time —time to prepare, time to mobilize an army of civilians, time to convert industry to war production—sufficient time, indeed, to meet every demand of warfare.

When we detonated the atomic bomb over Hiroshima on 6 August 1945, we gave new depth to the phrase "total war." We turned the strategic clock, as it were, back to an hour where we denied ourselves one of our strongest national bulwarks—time.

The atomic bomb loosed upon the earth a terrific urgency. There is a scramble on the part of other nations to develop a similar bomb, to harness its peculiar powers, and to realize the full war potential of atomic energy. In the Atomic Age, total war is but hours away. We cannot assume a false sense of safety behind our own atomic weapons and our own new developments because we can no longer measure time as a dimension of our national fortress. The time to prepare for future war was yesterday.

Even though we recognize our per-

ils and prepare for them with the certain knowledge that our time to prepare is running short, the load that any national security plan, based on current probabilities, places on signal communication is enough to stagger the imagination. Yet, if we cannot communicate, we cannot control; and if we cannot control, we cannot fight, regardless of the effectiveness of our plans and measures. The problem, then, is not to balance the security plan to the signal communication support available, but to develop our signal communication to the point where the required security plan, regardless of its scope, can be effectively supported.

It is to this end that the varied efforts of the Signal Corps are now bent, and it is obvious that the future of the Signal Corps is inextricably linked with the scientific and the technical. Indeed, the military future of the United States is dependent to a marked degree on the scientist. The technical developments, equipment, and concepts required by future war have brought the scientist from the obscurity of the laboratory to the prominence of the first assault wave.

German transceiver *Feldfu b.* provided 30 pre-set channels for AM voice operation over a frequency range of 90-110 megacycles, was designed as an individual portable pack set. 13 inches high, 4 inches wide, and 13 inches long, complete with battery, cable headsets, and laryngophone (throat microphone), the set weighed 29 pounds. Closest U. S. counterpart, from an intended-use standpoint rather than design, is the AN/VRC-3. SC engineers were especially interested in the fine frequency tuning controls of the *Feldfu b.*, which they considered ideal for HF operation.

Must Know Foe's Science

Since the scientific and the technical will play such a tremendous role in future war, we must develop our own program for the effective employment of advanced weapons, equipment, and science; and we must have, as well, timely evaluated information on the scope, limits, means, developments, uses and plans of the enemy's employment of science and industry for war—that is, we must have technical intelligence.

Further, once victory is assured, we must have a system for scientific research in enemy territory — the planned, co-ordinated examination and evaluation of the conquered territory's scientific and technical developments—in order to apply the enemy's scientific and technical capabilities to our own use, benefit, and recovery, consistent with our requirements at the time.

WW II Development

With a well-planned program of effective technical intelligence and scientific research in enemy territory, it is possible to augment, extend, and correlate existing technical theory, development, and practice to the point where the tremendous mission of the Signal Corps—and ultimately the mission of the armed forces—can be materially assisted.

Signal technical intelligence in World War II, developed after the lean military years of the 30's was closely related to signal planning from the very outset of the war, and in spite of the fact that much elementary intelligence data was initially unobtainable, the close co-ordination between signal technical intelligence and signal operational planning effected in the early stages of the war became the foundation for our present concept of signal technical intelligence and its application.

From the beginning, the signal planners figured on making maximum use of existing liberated or enemy communication equipment for tactical communication, permanent theater fixtures, and civilian rehabilitation. After this, the planners went ahead and arranged communication support using available American equipment solely, taking the attitude that if any captured or liberated facilities were available in usable condition, the task of US Signal Corps personnel would be so much the easier.

Tech Intelligence Vital

This technical intelligence viewpoint of the Chief Signal Officer and his staff was consistent with the premise of the Combined and Joint Chiefs of Staff, that industrial and technical intelligence—that is, timely information on the scope, limits, means, developments, uses, and plans of the enemy's mobilization and employment of science and industry for war—was vital to the Allied cause.

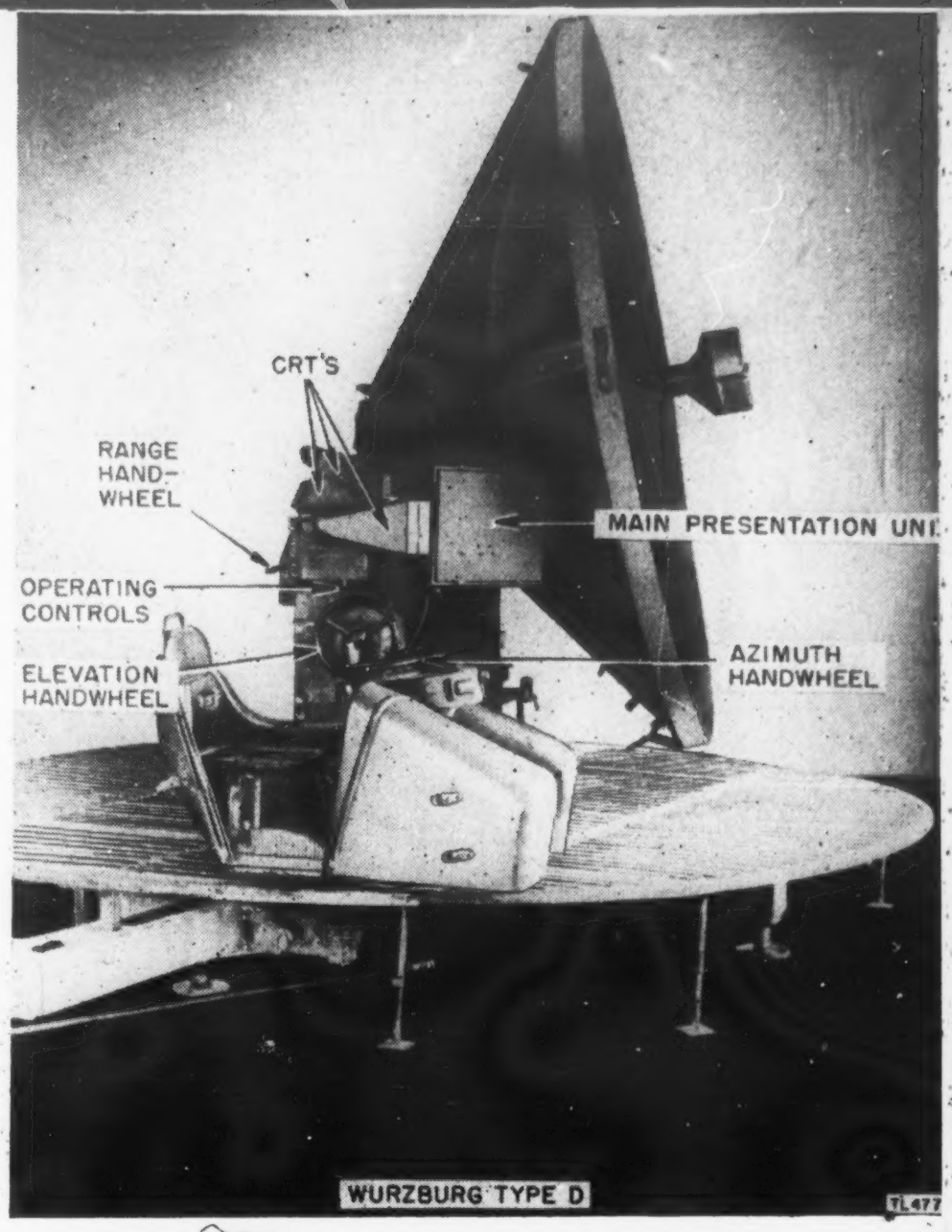
The Signal Intelligence Branch, OCSigO, meanwhile, had jellied its concept of signal technical intelligence into four objectives. These objectives comprised the framework of ideas from which was built the detailed plan for signal technical intelligence coverage. The objectives:

1. Prompt development of effective counterweapons and countertactics.
2. Prompt exploitation of new ideas for US benefit.
3. Early deductions as to the state of enemy resources for war.
4. Speed in providing literature and other aids to assist in training of troops in the use

and maintenance of enemy equipment when captured in sufficient quantities.

Identification Service

To provide a means of reaching these objectives, the Signal Intelligence Branch pushed the organization and training of units known as Enemy Equipment Identification Service (EEIS) teams, whose mission was "the recovery and evacuation of enemy signal equipment." Enemy signal equipment captured by US troops would be processed by the EEIS teams for shipment to the United States for study and evaluation, assuming, of course, that such local evaluation as the situation demanded had been effected at army level in the field.



This German radar unit is a smaller counterpart of the giant Wurzburg type used by the Signal Corps in connection with the moon radar experiments. German radar equipment was high on the EEIS priority list, and this particular set was one of the four standard German radar unit types.

Intelligence Groups, ETO

As the Allied troops fanned out from the beaches of Normandy, there were two distinct Signal Corps technical intelligence activities being carried on.

First, the EEIS teams were executing their mission with respect to enemy equipment. One EEIS team, consisting generally of five officers and six enlisted men, was operating with each army. Command responsibility for EEIS activities lay with the theater commander and was executed through the Chief Signal Officer, ETOUSA, but staff supervision was delegated to the signal officers at army group and army level.

Related to this, but concerned as well with existing fixed plant and similar equipment in France and the Low Countries, was the plan of the Chief Signal Officer, ETOUSA, to establish full communication support as soon as possible using as many existing liberated or enemy facilities as could be made available.

Though French communications were about fifty percent disrupted, by 10 September 1944—sixteen days after the liberation of Paris—the signal communication support for all elements of the American forces generally up to corps rear boundaries consisted of a little over fifty percent French fixed equipment.

The Chief Signal Officer, ETOUSA. performed the tremendous task of providing an efficient communication support network by the judicious use of US equipment combined with French, Belgian, British, and German equipment. 2,500 French long-distance circuits were in use from Paris Military Central; the entire French cable system was repaired and woven into the theater communications net; British central office equipment was in use; US carrier equipment, converted through on-the-spot modification and design change to work with French carrier facilities, added extra circuits to this tremendous system; soldiers of the Signal Corps worked side by side with Frenchmen in repeater stations; the ports of Marseilles and Cherbourg were served with 25-position captured German switchboards, and as operations progressed, existing facilities in Belgium, Holland, and Luxembourg were quickly cut into the theater net and communication continued to be provided to meet the ever-increasing demand. This extensive network, using so much in the way of existing and captured materiel, saved the US government untold expense—conservative estimates place the figure at five billion dollars—and an incalculable amount of labor for Signal Corps troops.

Inside Germany

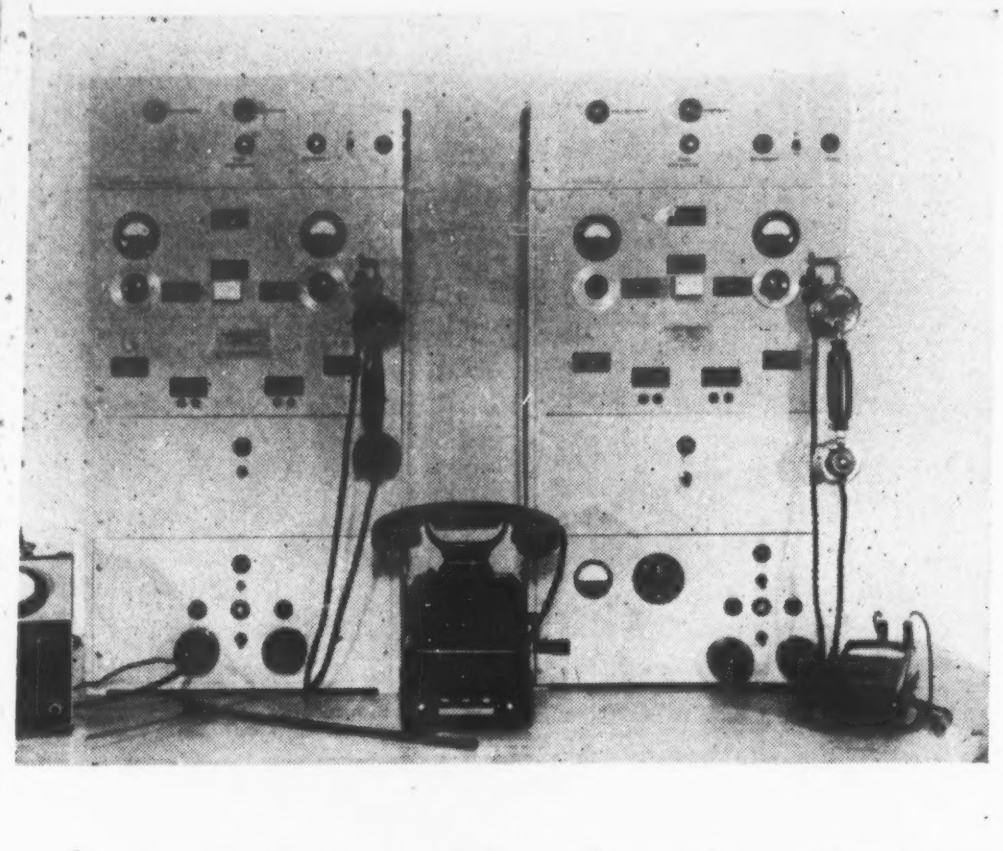
As our troops drew closer and closer to Germany, intelligence interest in technical and industrial possibilities, together with the need to determine the exact extent of German scientific and technical support to the Japanese, grew to the point where it was decided to expand the existing technical intelligence coverage so that every possible scrap of technical information could be wrung from Hitler's *Reich*.

An idea of the scope of Signal Corps' technical intelligence interest during the combat phase in Germany may be obtained by considering the projects and accomplishments of the various agencies who were concerned directly with the collection of this technical information.

German Data Gathered

TIIC (Technical Industrial Intelligence Committee, organized in 1944 by the Joint Chiefs of Staff from representative government agencies), for example, used its communication section to watch for a German method of the quality production of titanium dioxide capacitors for radio circuits, a factor which had been troubling US experts for some time. Other TIIC targets included data on the German production of slab calcium; field wire stranding machines; a transformer-impregnating material that could be hermetically sealed to eliminate potting; German moisture-proofing methods, and the enemy's system of forming metal-to-glass seals in miniature tubes.

CIOS (Combined Intelligence Objectives Subcommittee, representing the Combined Chiefs of Staff) teams



German KPP packaged carrier equipment had several design features of interest to SC engineers, notably the close-tolerance engineering of resistors, pads, and coils to provide high transmitting fidelity at low-power input.

were beating up and down the roads of Germany seeking vitally needed Allied communication information on infra-red applications; remote-control systems for aircraft, vehicles, and torpedoes; methods of stabilizing super-high frequency radar equipment; new vacuum tubes; stable non-crystal-controlled oscillators; German radio interference suppression data; enemy means of the radio location of Allied mortar shells in flight; sound locating systems, and a host of other targets that were of value to the Allies from a production, development, countermeasure, or troop-use standpoint.

Equipment Found

EEIS teams located valuable technical intelligence items like German special direction-finding equipment with an accuracy up to one-half degree; tape antennas; infra-red pulse emitters; the huge Wurzburg parabolic radar reflectors later used to some extent by the Signal Corps in connection with the moon radar experiments and by the Bureau of Standards in its studies of cosmic rays; guided missile data and samples; photographic equipment; metal-to-ceramic seal radio tubes; wire equipment, including the German F-36-st switchboard which provided data for a switchboard mainstay of the new integrated US theater-type communications system, and countless other pieces of enemy signal equipment which were shipped to the United States for Signal Corps laboratory evaluation as these teams extended their coverage behind the combat troops.

Meanwhile, the Chief Signal Officer, ETOUSA, was concerned with extending the effective theater communication net into Germany. Here again captured German equipment played a major role. Using captured German civilian signal experts, *Wehrmacht* supplies, German factories, and raw material uncovered by the technical intelligence teams and the Industrial Control Section of the Signal Staff, ETOUSA, the best of communication support was rapidly and efficiently extended into Germany.

Initially, outside plant and central office equipment was used for a hasty extension of circuits, but even as Allied troops crossed the Roer River, German *Decimeter* equipment, which is comparable to the US Army AN/TRC-6, was being used effectively by our signal troops. Supporting signal units of the First Army located a German 90-line teletype switchboard with two attendants' positions at Aachen, and pronounced it far superior to the US TC-3 after it was installed and used in the teletypewriter net. (*Ed. Note: Signal Corps technicians say that the TC-3 is a neutral type 10-line teletypewriter switchboard designed for field use and is not considered entirely comparable to a fixed plant type polar operation switchboard such as the German type referred to.*)

The German national telephone organization, *Deutsches Reichspost*, was put to work rehabilitating the existing plant that had been damaged during the advance of the Allied Armies. Huge signal depots were established at Mannheim and Nuremberg where German civilian communication engineers worked with TIIC experts and US signal troops sorting, classifying, and readying captured signal equipment for further support of the Allied effort.

Use of Captured Wire

Probably the best example, however, of the use of captured signal equipment by assault troops in action was the use made by US armored divisions of German field-wire facilities.

By using captured German field-wire, switchboards, telephones, and associated equipment, every armored division in the theater built up wire nets to the point where wire communication was available down to company and platoon level. Armored unit equipment tables now authorize an increase in wire equipment over World War II allowances, permitting the use of organic wire communication at levels below the combat command when the situation makes it feasible.

Considering that our conceptions of technical intelligence in World War II were developed and applied from our scratch intelligence position of 1940-1941, they were effective. Nonetheless, they were half-measures, and there was an almost pathetic urgency about the scramble for this information that might well have been avoided had we possessed a dominant intelligence premise during peacetime.

Even as the defeated generals of the German High Command were putting their signatures to the surrender document in the schoolhouse at Rheims, Signal Corps personnel were swarming across Germany to complete the job of tying in the Army long-lines system with existing German facilities in order to service a long tour of occupation duty.

FIAT Formed

As occupation missions were crystallized, the Signal Corps technical intelligence mission passed from the hands of ETOUSA, EEIS, and related groups to a specially organized unit known as Field Information Agency Technical, or FIAT. This agency, formed largely from US personnel of Technical Intelligence T-Subdivision, SHAEF, was given the mission of collecting and evaluating all German scientific and technical data of potential military or industrial value to the United States. For the first time in American history, then, an organization was formed specifically for the purpose of scientific research in enemy territory.

TIIC, referred to earlier, was placed under FIAT operational control, but Zone of the Interior coordination and fiscal responsibility for TIIC was assigned to the Office of Technical Services of the Department of Commerce. CIOS and other technical intelligence agencies were phased out.

FIAT's approach to the executio

of its mission was based on the assumption that all branches of the service and all industrial representation could be coordinated and controlled with maximum effectiveness under a single head.

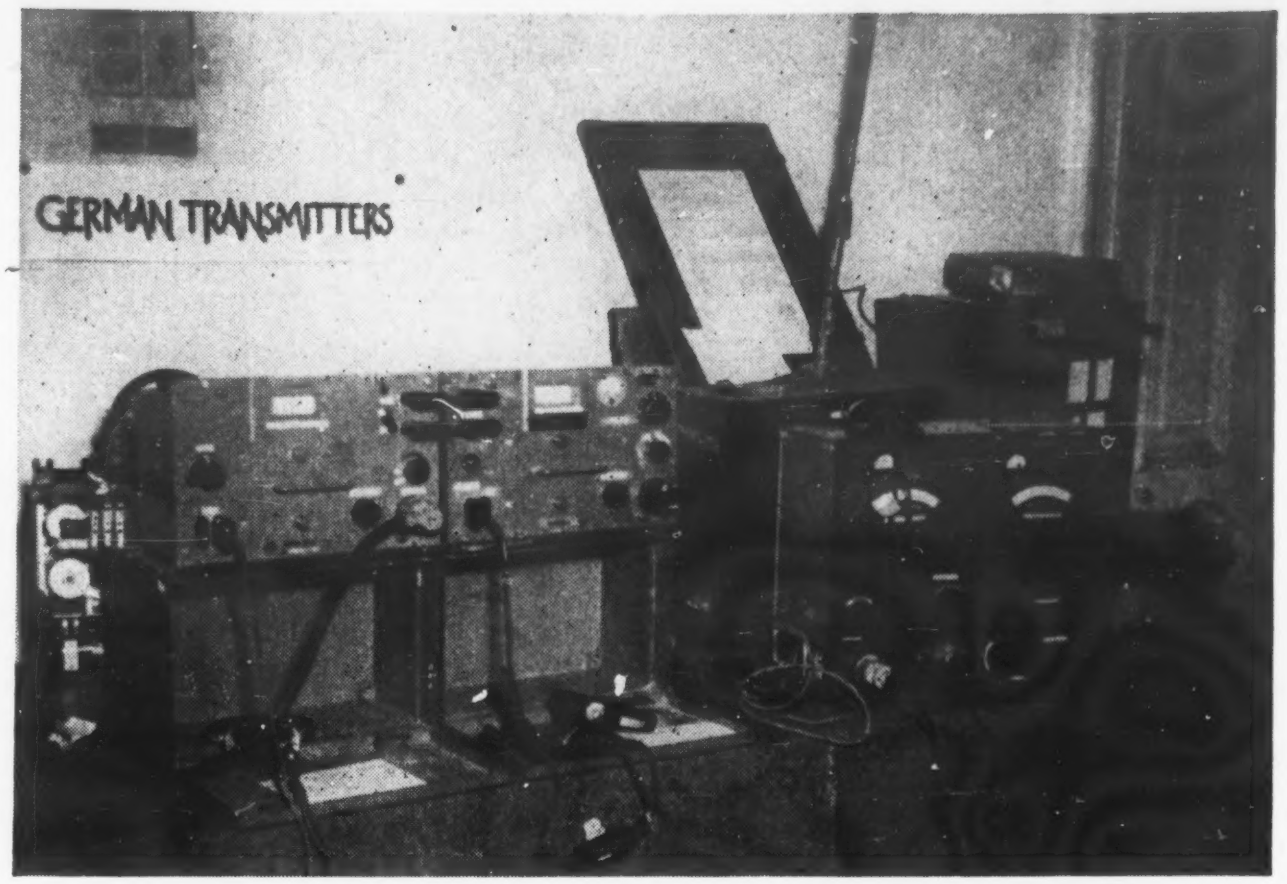
Each branch of the service had qualified personnel with some background in technical intelligence stationed with FIAT. The Navy, State Department, Air Force, Ordnance, Quartermaster Corps, Corps of Engineers, and Chemical Corps were represented. Three former EEIS officers handled Signal Corps interests.

Industrial communication interests were coordinated through the Electronics and Communication Section. which worked very closely with the Signal Corps branch. Later, after FIAT operations were underway and organizational kinks were smoothed out, Electronics and Communication was combined with the Signal Corps branch under one section title.

The operational methods of this Electronics and Communication Section of FIAT were interesting. Running surveys of existing data, records, and requirements were matched against the target lists and source files. Each possibility was carefully explored by one of the Signal Corps officers or by a specially assigned industrial representative. The result in each case was carefully evaluated and reported in a FIAT final report which was shipped in manuscript or on microfilm to the United States. If the information had a direct or immediate military application, it was sent to the Chief Signal Officer and JIOA under appropriate classification. If industrial application was more likely, JIOA disseminated the data to private industry on a cost-of-reproduction basis.

Rebuilding Communications

Meanwhile, the problems of the Chief Signal Officer of the European Command were centered around the further application of existing German facilities to improve the theater net. The ravages of the war in Germany had disrupted communications in the US zone an estimated sixty per cent, and a well-planned rehabilitation program had been in operation almost since the first US troops entered Germany. US signal planning and engineering personnel went into conference with representatives of the *Deutsches Reichspost* and with engineers from the big German communications equipment factories like *Telefunken* and *Siemens-Halske* so



German tank receiver (left) and tank transmitter (right) were widely used in German tanks.

that both occupation requirements and German civilian rehabilitation demands could be met successfully.

A first-class occupation military network was an early result, and one of the most interesting developments was a military through-toll dialing system which was operating within the first year of the occupation. This had been started by *Deutsches Reichspost* during the war, and permitted a greatly increased traffic load between such key US zone cities as Frankfurt, Munich, Bamberg, Heidelberg, Nuremberg, and Kassel.

At Ginsheim in the US zone, a repeater station that was a central terminating and cross-connecting point for all toll circuits in the US zone, as well as into and out of the French and British zones, was completely rebuilt as part of the military network. This station, which became the hub of the zone communication system, used combined German and American carrier equipment for voice circuits, and the five armed forces radio stations in the zone were serviced through this station on German program-arrangement circuits.

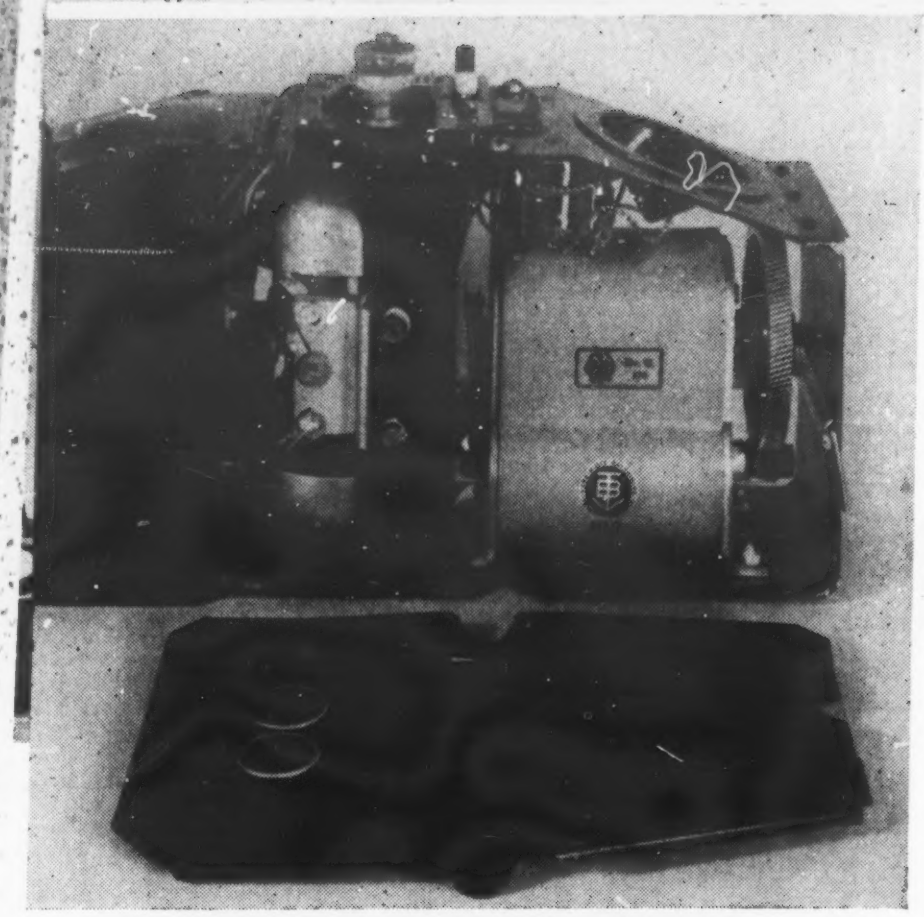
Some German Developments

There were many other similar applications of foreign equipment to the US military network in the occupation of Germany, but the significant feature to be borne in mind is the fact that necessary design changes and equipment modifications were planned on the ground with a minimum of lost time and lost service. The principles involved in communication equipment are unchanging; it is merely their application that varies, and with imagination, foresight, and initiative foreign equipment can be readily fitted into our military networks.

Results turned in by the Electronics and Communication Section of FIAT included German synthetic mica processes that produced *ersatz* mica that was accepted for real mica when the first sample was examined at the US Bureau of Standards; a machine for producing and grading selenium oxide discs for a dry-disc rectifier superior in certain respects to any now being produced in the United States; a tiny teletype polar relay of equal efficiency and one-third the size of existing US counterparts; a special grease that absorbs sonar waves when spread on submarines; a new departure called the magnetophon that was used in German broadcasting stations to eliminate surface noise on records; wire and tape recording machines; a phase microscope using the Zernike optical principle, hailed as the most important optical discovery in the last fifty years; powdered-iron core inductances with superior electrical characteristics and stronger mechanical qualities than similar American types; multiple gun cathode ray tubes, and further information on the control systems, launching methods. and triggering mechanisms of guided missiles.

Rich Scientific Trophy

On 30 June 1947, FIAT was formally deactivated, and our scientific



German field telephone, very widely used by U. S. Armored divisions in their wire nets built up from captured German field-wire equipment.

research in Germany stopped. Unquestionably, FIAT crated the richest military trophy in American history. The Signal Corps, in turn, is credited with major assistance to the FIAT mission.

Consistent with our present national security policy, the Department of the Army has undertaken to provide effective command control, planning, and training for future war. Mindful of the lessons of the past, military policy leaders have vested technical intelligence responsibility in the Scientific Branch of the Intelligence Division, Department of the Army. The implementation of technical intelligence missions in the field, according to plans for the future, will be executed largely through the use of enemy equipment technical intelligence teams (EETIT).

EETIT Missions

EETITs will represent the various technical services within a given theater, and all EETITs, regardless of the level at which they will ultimately operate, will be assigned to Theater Headquarters and will be controlled by an EETIT theater-type detachment present in the theater on the basis of one theater-type detachment for each technical service. The theater-type team will report to its respective technical service chief, who will effect necessary coordination with other interested arms and services within the Zone of the Interior.

The purpose of the Signal Corps enemy equipment technical intelligence teams is to "insure prompt, complete exploitations of captured signal equipment and literature, in such a manner as to assist the immediate tactical situation and the long-range strategical situation."

The four major objectives to be achieved in EETIT activity are as outlined previously — prompt development of effective counterweapons and countertactics; prompt exploitation of new ideas for our own benefit; early deductions as to the state of enemy resources for war, and speed in providing literature and other aids to assist in training troops in the use and maintenance of enemy equipment when captured in sufficient quantities.

The lowest level at which Signal Corps EETITs will operate is the division. Command responsibility and staff supervision over all EETIT activity within the theater will be exercised by the theater-type EETIT detachment.

In the planned flow of enemy signal equipment, and enemy signal documents, coordination within the theater with other arms and services is to be executed by the theater G-2, and coordination in the Zone of the Interior will be effected by the Chief Signal Officer.

EETIT Awaits Approval

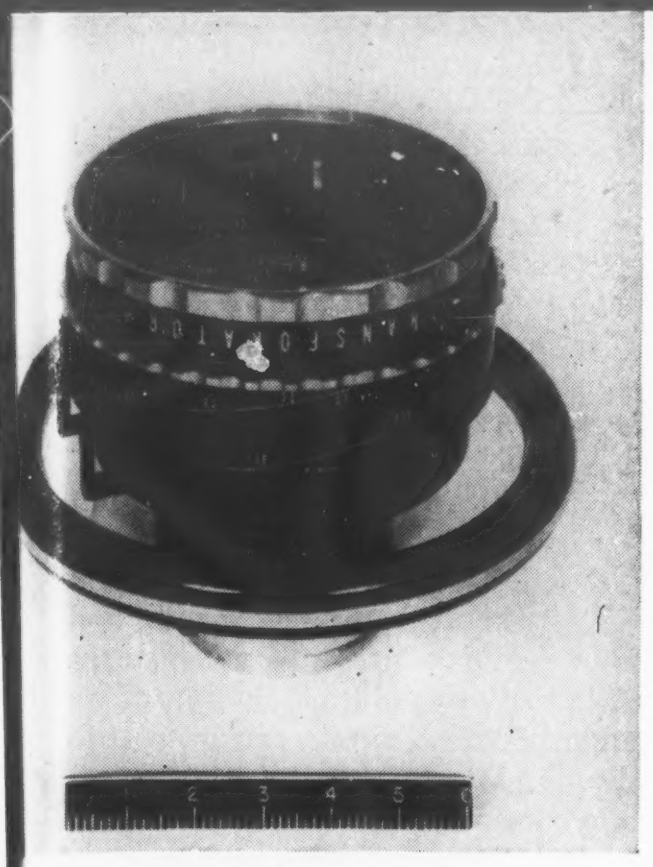
Thus, the concept of signal technical intelligence within the theater of the future is based almost entirely on the use of these EETIT detachments at six levels — Z1, theater, army group, army, corps and division. Its ultimate effectiveness in furthering the signal technical intelligence mission remains to be tested.

The technical intelligence and scientific research in enemy territory of World War II, so far as the Signal Corps was concerned, was sufficiently effective to play a major part in signal communications support of combat operations within the European Theater and to provide certain benefits from the scientific exploitation of occupied Germany. We enjoy today, however, the privilege of a second guess, and in that light we must be satisfied with nothing except a permanent implemented conception of the aims, means, and uses of signal technical intelligence. Anything short of this, as we have observed from our previous failure to adopt a peacetime technical intelligence doctrine prior to World War II, will lead to the wasteful diffusion of intelligence effort.

WW II Intelligence Flaws

It is the writer's considered opinion that there were two major flaws in the technical intelligence coverage in the European Theater during World War II. First, there was the lack of a single controlling agency with overall technical intelligence responsibility for the American phase of the Allied effort. Seven technical intelligence agencies were active in the European Theater, and each one was concerned with signal communication. Yet, control and coordination problems were multiplied because there was no effective centralized control within the theater. Secondly, technical intelligence activities in the theater were not sufficiently decentralized. EEIS teams, CIOS, TIIC, T-Subdivision and the others all operated from the army level or the army group level, rather than from the division level. This resulted in a time lag between initial discovery or location of technical intelligence targets and evaluation; it affected complete coverage, and resulted in duplication of effort.

From the reference data available to the writer, it appears that future plans for technical intelligence coverage within a type theater offer no reasonable solution to the problems of an organization lacking in central control and decentralized operation. Future plans indicate that at higher levels, such as the Cabinet, Joint Chiefs of Staff, and the Department of the Army, technical intelligence responsibility and authority has been so delegated as to provide efficient application at top planning echelons of the technical intelligence principles of countermeasures, strategic benefit, extent of enemy preparation, and troop usage of captured equipment. It is the field of execution of technical intelligence operation that seems doomed to failure, primarily



A FIAT trophy, this German "Transfokator" lens permits the operator to vary the focal length of his camera at will, and is a means of eliminating "boom," or traveling, shots in motion picture photography.

for the same two reasons that similar operations in World War II were hampered.

Central Agency Recommended

Under proposed doctrine, each technical service will have EETIT detachments operating within the theater at every level, including the division. While this provides a certain decentralized operation, the supervision of these teams rests with the appropriate technical service staff officer at theater headquarters. The result here again will be an undesirable diffusion of effort. Further, proposed doctrine indicates that technical intelligence activities within the type theater will consist largely of the collection of captured enemy equipment. The examination and evaluation of captured enemy equipment is actually only one phase of technical intelligence. True, it is the more important phase so far as the theater is concerned because theater interest is primarily in short-term operations, but such Zone of the Interior technical intelligence responsibilities as production, research, and development require extra data and information. The writer feels that such technical intelligence can be given an effective initial collation and evaluation within the theater by a single central technical intelligence agency having control, command responsibility, and staff supervision over all EETIT and related technical intelligence functions within the type theater.

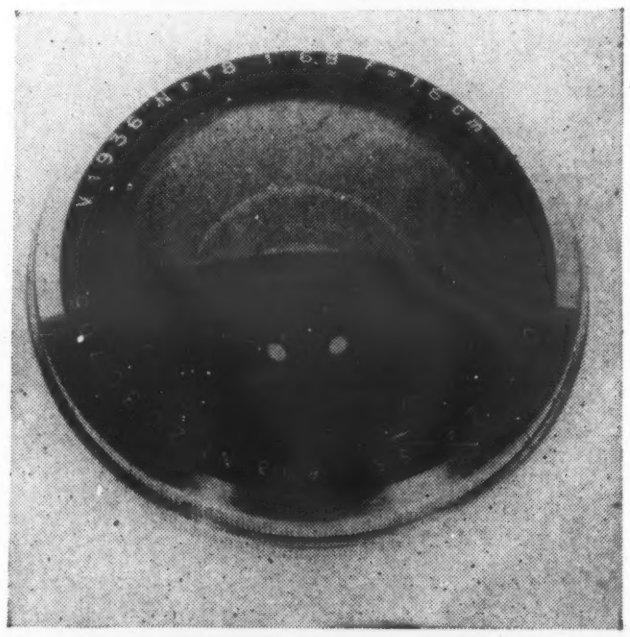
Accordingly, it is recommended that serious consideration be given to the establishment of a Technical Intelligence Agency (TIA) within the type theater. The mission of this recommended TIA should be substantially as follows: to control and supervise all EETIT activities for all technical services within the theater; to collect, collate, evaluate, and disseminate technical intelligence within the theater during combat; to keep the Zone of the Interior supplied with enemy equipment and technical intelligence data consistent with top level technical intelligence requirements; to coordinate and control technical intelligence collection for interested US industry, services, governmental departments, and Allies during both the combat phase and the occupation phase as directed by the Joint Chiefs of Staff; finally, this agency should carry out the scientific research and exploitation of enemy territory during the occupation phase on a basis consistent with US policy and treaty agreements in effect at the time.

TIA Advantages

The inclusion of such an agency within the type theater will permit the centralized control of all technical intelligence activity within the theater, thereby eliminating duplication of effort, decreasing coordination requirements, and facilitating planning. Further, operating agencies and staffs will be released from burdensome technical intelligence supervision, dissemination of technical intelligence will be improved, and utilization of available enemy equipment will be enhanced.

The functional organization recommended for such a technical intelligence agency merely brings all EETIT and related technical intelligence activity within the theater under a single head. At theater level, TIA maintains liaison with the theater G-2 and theater signal officer, but TIA is responsible to the Joint Chiefs of Staff, and not to the theater commander. The Control Section, TIA, is the agency's coordinating section and executive element, responsible to the Director, TIA, for all activities of the agency. Administrative Section handles agency personnel, administration, supply, transportation, and the actual final packing and crating of equipment to be shipped to the Zone of the Interior. Dissemination Section is a publications, cataloguing, reference, and distribution element, responsible for dissemination of completed intelligence reports as they are received from the Operations Section. Operations Section controls the actual collection, collation, and evaluation activities of TIA through its seven subsections. Targets subsection is an office of record and registry, and prepares and compiles target lists for the other subsections and the lower level TIA detachments. Research and Developments subsection handles such production, research, requirements, data, projects, and intelligence as may be of immediate interest to Research and Development staffs at Department of the Army, Joint Chiefs of Staff, or Cabinet level. Army subsection controls, coordinates, and assists the technical intelligence and EETIT activities of the technical services through the TIA detachments at lower levels. Navy, Air, and Allies subsections, in turn, represent their respective interests in the technical intelligence field. Field subsection handles US industry, governmental departments, and such technical intelligence collection, evaluation, and investigation as may be of concern to non-military elements that are not interested in the farther-reaching purview of the Research and Development subsection.

Extreme wide angle Zeiss lens.

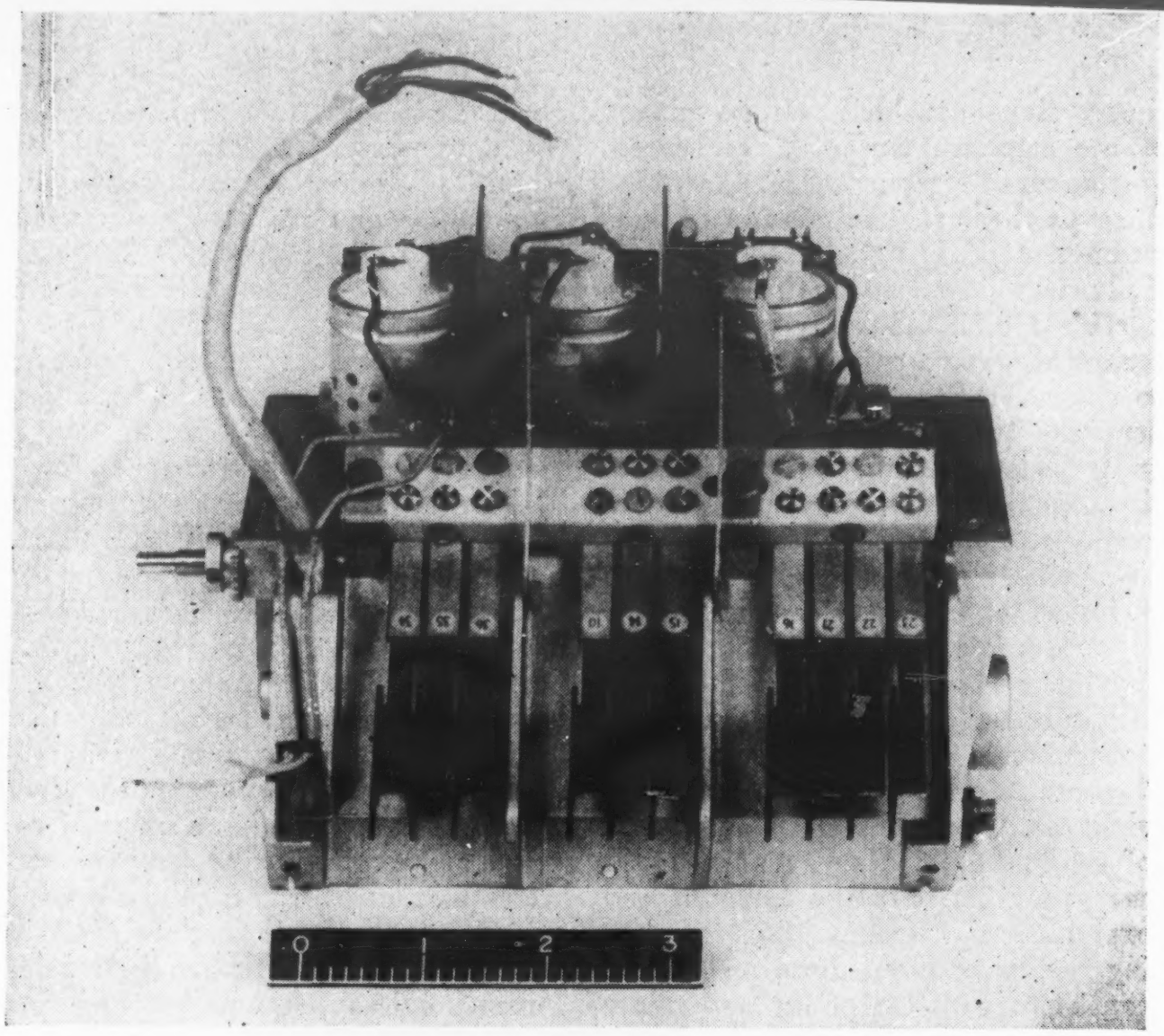


Theater Controlled

It is recommended that this agency be attached or assigned to the type theater so that all TIA activity, regardless of operational level, is controlled from the theater TIA Headquarters. This is similar to the organization proposed for the EETIT system, and insures minimum duplication of effort.

The army group TIA detachment is primarily a liaison organization, and it provides the theater TIA with a lower coordinating level.

The army TIA detachment is likewise a decentralized controlling element for the theater TIA, and it has direct supervision over all EETIT



Bottom view of the HF compartment of the German Radio Receiver Type Torn Eb, showing the coil switch contacts, connecting cable, and grid connections to the HF tubes. Set has no U. S. counterpart, was widely used in the German infantry, and was normally housed and carried in a knapsack. Several models were turned into SC Engineering Labs by EEIS teams. Lab engineers thought the turret design of these HF tubes ideal in a field pack radio receiver.

and technical intelligence activity within the army. It consolidates reports, provides technical intelligence liaison with the various army general and special staff members, and coordinates enemy equipment shipments within the army.

The corps TIA detachment supervises EETIT and technical intelligence activity within the corps, assists the division TIA detachment, initiates reports, assists field investigators from theater TIA, and controls assignment of EETIT teams to the divisions. It is not considered advisable to assign EETIT teams to divisions, or to make permanent or semi-permanent attachment of such teams to divisions because a certain wasted effort would result. It is anticipated, however, that EETIT teams representing such technical services as are interested at the time will accompany each committed division. This is similar to proposed doctrine, which contemplates final control of EETIT by the corps EETIT detachment.

The division TIA detachment, however, would be expected to remain with the division as a permanent attachment or assignment, since this would provide continuous technical intelligence contact with the division, and would permit more effective employment of EETIT teams.

No effort has been made to visualize personnel requirements for the various sections and detachments of this recommended Technical Intelligence Agency. The overall personnel requirements of this theater system would require further study in great detail. It is emphasized, however, that in the ever-increasing complexity of the scientific and technical aspects of warfare, specialized knowledge and specialized skill are required. In the technical intelligence field, certainly, the day of the many-sided expert is fast disappearing. It is felt that this recommended system will require a relatively large staff of experts for each section at theater level, and at least partially-trained personnel with some background in their respective technical services at the lower levels.

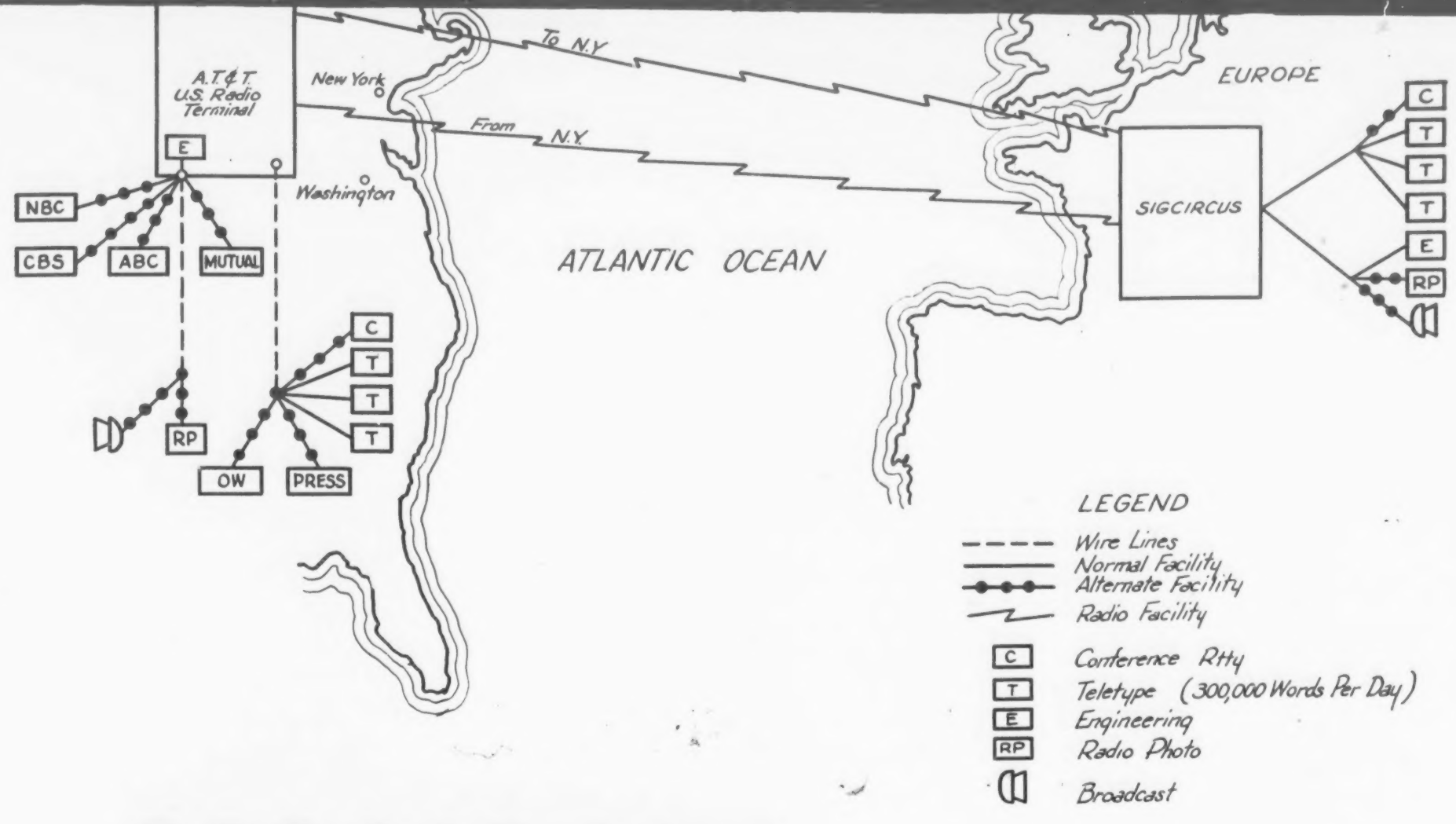
Signal Section Operations

The recommended functional organization for the Signal Section at theater level follows generally the organization of the Technical Intelligence Agency. Overall responsibility for the work of the Signal Section rests with the section chief. The chief is assisted by the deputy. Control and Targets Section coordinates the work of the section, and handles administrative detail and final dissemination of Signal Corps data and technical intelligence. The operations of Signal Section are split into two major divisions to facilitate control. Operations, under the Executive for Operations, is responsible for the examination, evaluation, and collation of data within the zones of interest indicated by the five subsection blocks: Radar and Navigation, Signal Research and Development, Photographic and Optical, Electronics, and Communication. Field activities are under the control of the Executive for the Field, and this division controls Signal Corps EETIT activity, other field target investigation of communication significance, and technical intelligence for immediate use by signal units within the theater. Thus, this Signal Technical Intelligence subsection would provide planning data, recommendations for the use of existing and liberated communications facilities, and suggestions for troop-use of captured signal equipment. This organization, of course, is purely hypothetical, but it is presented to indicate the probable scope of future successful technical intelligence coverage for the Signal Corps within the type theater.

Future Warfare Demands TIA

The writer feels that the proposed EETIT system, discussed earlier, errs in providing for only the captured enemy equipment phase of technical intelligence. It is considered that this recommended TIA system will provide the overall centralized control with decentralized operation that must characterize successful technical intelligence operations of the future.

It has been pointed out earlier that the future of the Signal Corps is inextricably linked with the scientific and the technical. The demands of future warfare will increasingly emphasize the importance of technical intelligence and scientific research in enemy territory with relation to the accomplishment of the Signal Corps mission. Career officers in the Signal Corps, as well as the officers of other services, must continually weigh the probabilities of the future on the scales of the past. The vital effect of technical intelligence on future military operations cannot be overlooked. In the time displacement wrought upon us by the trends of modern and future warfare, technical intelligence and scientific research in enemy territory may well provide the balance between victory and defeat. We stand at an intelligence Armageddon—let us select the proper weapons.



SIGCIRCUS

The Signal Corps' Largest and Most Powerful Mobile Radio Station—60,000 Watts

By Loyd C. Sigmon
Lt. Col., Signal Corps Res.

In the phenomenal military successes of the United States Army there has undoubtedly been no factor more important than the Signal Corps' technological genius. In the recent war especially was this evidenced in the highly portable and complex systems developed for intercommunication between tactical and strategic units. Tying together units from squads, platoons, and companies, to entire armies, these systems made possible the close collaboration so vitally necessary to the successful prosecution of modern war.

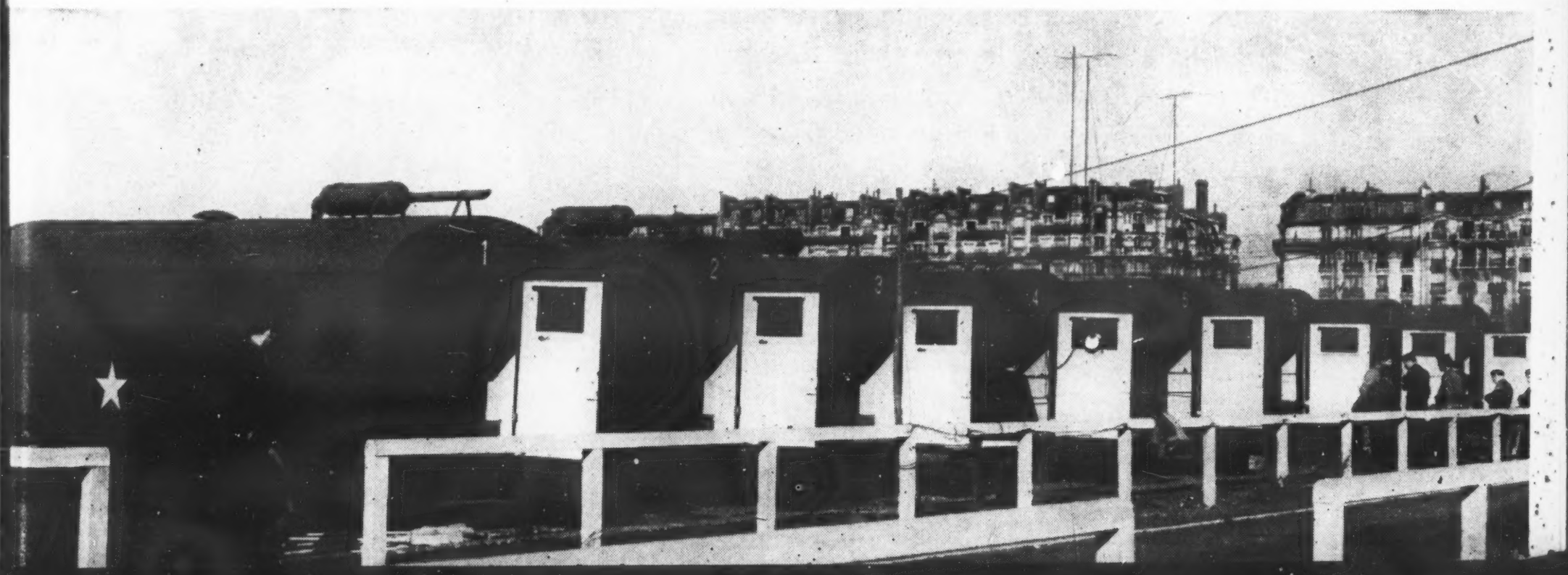
The story of one of these miracles of modern communications equipment can now be told—a story of stupendous achievement in engineering and production. It is the story of Sigcircus—a completely duplex, single side-band mobile radio station with all the facilities of a fixed station of comparable size, which could be rapidly dismantled and moved, or set up for operation by the radio section of the Signal Corps, as actually happened, within ninety days after commencement of construction in the European Theater.

Sigcircus was developed as the answer to a problem that was peculiar to the armed forces of the United States. In addition to the need for normal intercommunication facilities within the European Theater of Operations, our expeditionary forces were faced with the problem of keeping in constant contact with the far-distant home front. Furthermore, the rapid advances and unpredictable day-to-day locations of this enormous fighting force made especially difficult the maintenance of communications and the exchange of all-important information with a final rear echelon thousands of miles away.

The logical solution to the problem was a complete high-power radio station which could be easily moved wherever it was needed. But while such a station was simple enough to conceive, the actual planning for its construction presented myriad difficulties.

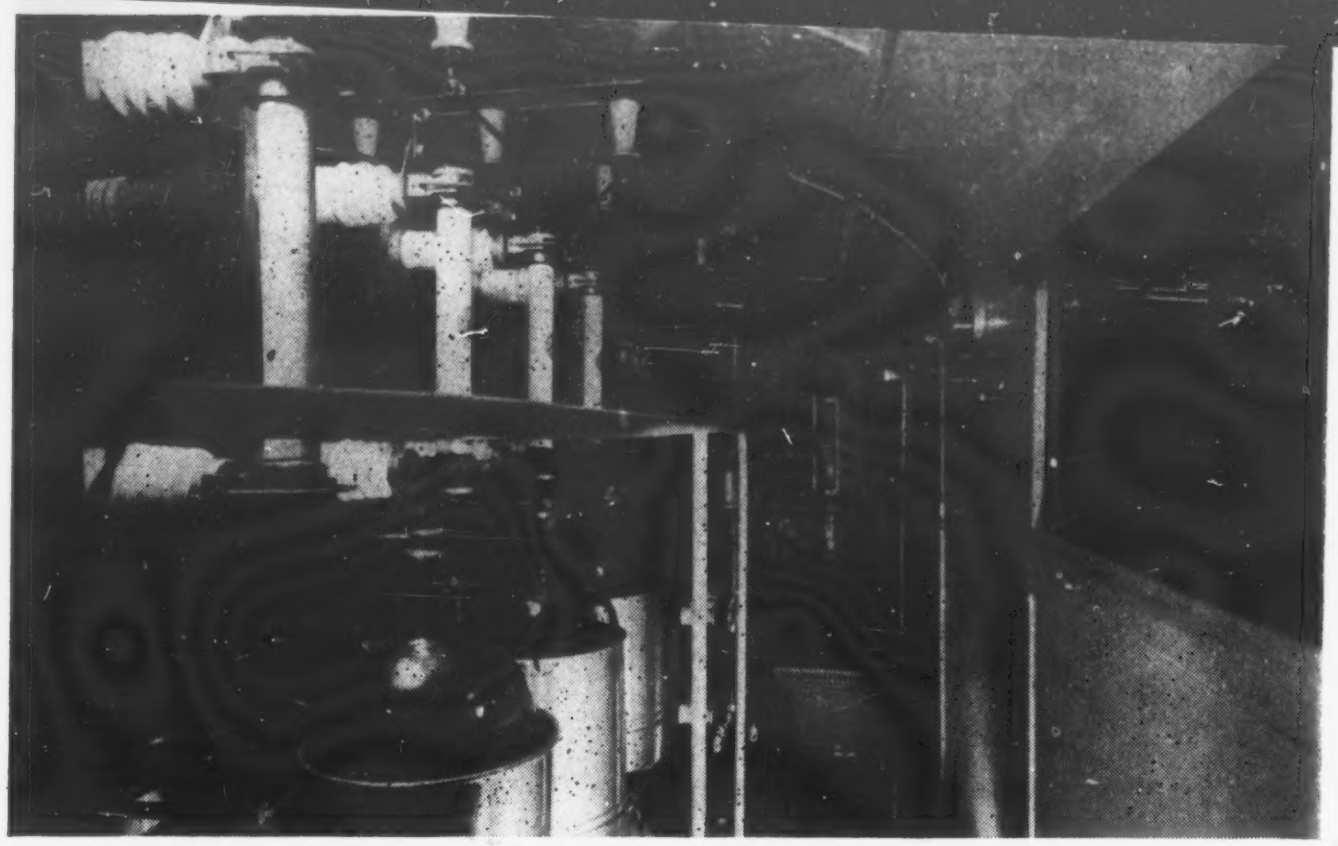
To begin with, the project was of a magnitude that had never even been attempted. Added to that, the prob-

60 KW transmitter trailers during original Sigcircus installation.



lem of procuring necessary equipment and parts during wartime, at least with any reasonable rapidity, was a formidable one. It tended to suggest almost insurmountable obstacles.

In spite of the numerous hurdles, the Signal Corps in the ETO was not deterred in beginning development of the single side-band, completely mobile radio station. Under the direction of the Signal Corps radio section construction of the station was begun by a French manufacturing company in Paris—Le Telephonique, a subsidiary of the International Telephone and Telegraph Corporation. The Signal Corps supplied all materials and all tubes not available to the French company at the time of construction.



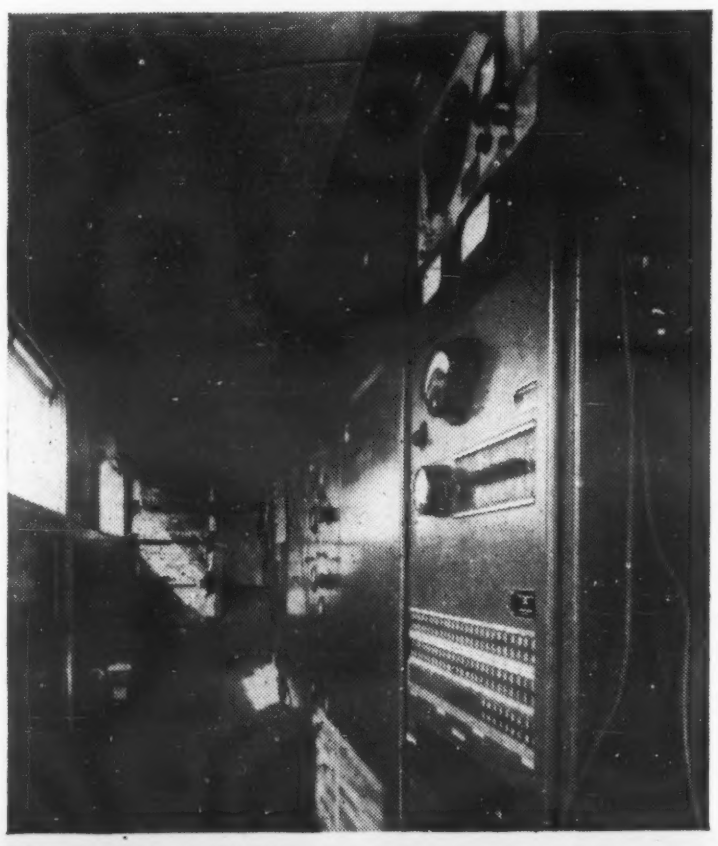
High voltage rectifier trailer. Interval view of right side.

Speedy Construction

Completed in the amazingly brief time of less than three months, the new mobile station was turned over to the Chief Signal Officer of the ETO at the first crossing of the Rhine and the closing of the Colmar pocket. The station delivered an output power of 60 kilowatts and was built into seventeen large trailers provided by the French firms Millonguiet and La Societe Parisienne de Materiel Coder.

In addition to the normal message-handling radio teletypewriter chanels which provided for simultaneous transmission and reception between Europe and the United States of as many as 300,000 words daily, Sigcircus was equipped with complete broadcast facilities. These included a portable American Forces Network transmitter (300 watt), a modern broadcast studio and control booths, as well as complete equipment for facsimile transmission and reception of photographs and wire, film and disc recording.

SSB transmitter shockmounted in 8-ton trailer. Front view.



Multi-Service Broadcasts

Though designed to provide broadcast service to the United States, the station was also capable of providing local programs for the entertainment of Allied troops within a radius of twenty-five to thirty miles of the station on the broadcast band. All these services—radio teletypewriter operation, local broadcast, as well as photograph facsimile, and broadcasts beamed to the United States—could be carried on simultaneously without interference.

Once the radio station convoy reached the selected location, the completed unit was to be installed for operation in twenty-four hours, but under actual field conditions it was set up and in operation in twelve hours and ten minutes after its arrival on the chosen site, this being accomplished on its first mission into Frankfurt, Germany. The rhombic antenna arrays were supported by seventy-two foot masts, joined in easily-handled eight-foot lengths for convenient transport and erection, and could be set up in fifteen or twenty minutes by a trained team.

High-powered radio receiving and transmitting stations were placed a considerable distance apart to avoid mutual interference between transmitted and received signals, and usually were connected by telephone lines. In Sigcircus, however, an efficient innovation was included, whereby inter-communication between units was carried on by means of a special, very high-frequency radio link.

All the equipment for the completely independent operation of the station was ingeniously disposed in the seventeen trailers which were nominally divided into two general groups: transmitter, signal center.

Sigcircus operated entirely independent as a unit, being designated as a company. Therefore it had its own administration officers, mess team, and other specialists designated for the operation of such vital communication equipment.

Generated Own Power

In order to operate such a large radio station it was necessary that the station generate its own electric power at both the transmitter and signal center, since they were widely separated. The transmitter portion carried 150,000 watts of electrical generating equipment, and the signal center, 25,000 watts. The generating units operated from diesel oil; therefore, it was necessary that sufficient diesel oil be carried for long periods of operation, in addition to all spares and replacements such as large tubes which were required for the 60-KW radio amplifier.

Sigcircus carried by shortwave to the networks of the United States the broadcast of the surrender of the Germans and numerous other broadcasts, prior to the surrender, from the European Theater. Few people can possibly realize the tremendous engineering skill of the Signal Corps which brought about such broadcasts to the United States.

(*The author wishes to take this opportunity to express his appreciation to all those who assisted in the construction and operation of the 60 kilowatt radio station.*)

They Called Him A
FLAGFLOPPER

By Emmett E. Robinson

Atop a sun-baked mesa in New Mexico a lone Comanche raised his war lance and waved it. His comrades, battling some miles away with another tribe, saw the movement. They halted their charge, wheeled their mustangs, and retreated over the buffalo grass at top speed. That one movement of the lance had told them the enemy was being reinforced.

On another hill stood a tall, erect young man. His piercing eyes took in every detail of the skirmish with an interest equal to that of the Comanches. He was already known as a man who would take hold of an idea and follow it through its length and breadth, developing all there was in it or to it.

The Indians disappeared. The young man returned to camp and began to work on an idea which carried him through nearly thirty years and a series of successes and defeats. Today the idea, as developed by him, affects the daily life of people all over the world.

The man was 24-year old Lt. Albert James Myer, an assistant surgeon in the U. S. Army. Out of Myer's original idea—that such motions as those used by the Comanche warrior could be utilized for connecting adjacent military posts or units—came the U. S. Signal Corps, U. S. Weather Bureau, International Storm Signal Service, and the flag signal systems used by the U. S. Navy and Boy Scouts.

Sign Language Prompts Idea

A former apprentice telegraph operator and heir to a considerable fortune, Myer became interested in the art of motion telegraphy as a student at Buffalo Medical College. In doing research for his thesis, "A Sign Language for Deaf Mutes," he probed into its military aspects. Myer found that from the remotest times the maintenance of communications by transient signals had stumped military commanders. When simple, the signal was inefficient; when efficient, it was so unwieldy as to be impractical. Myer believed there was an answer somewhere.

After graduation Myer established himself as a physician. He practiced successfully for three years before he asked for and received a commission in the army. He was sent to New Mexico, where he found the answer —in the movement of a Comanche lance.

The young surgeon devoted all his leisure hours to his idea. By 1856 he developed a simple yet efficient system for military signalling. He headed east and took out a patent on his invention.

Idea Opposed

When Myer presented it to army officials, he met with stiff opposition. They scoffed when he said he had devised a method by which he could write any sentence by means of three motions of a flag, or of a torch at night, and that this could be read at a distance of many miles. "What," the officials asked, "would a noncombatant know about military affairs?"

Undaunted, Myer still believed in his system. He struggled for two years before a board finally directed him, through the Secretary of War, to conduct experiments. The experiments, much to the surprise of army officials who had belittled the "flag-flopping" and "wig-wagging," proved successful.

Secretary Floyd commended the system to Congress, which then appropriated $2,000 for equipment. The bill added to the staff of the army one signal officer with the rank of major. Myer became the major.

It looked like a victory for Major Myer. But the real test was yet to come. Myer received orders to try the system under actual field conditions in the Navajo campaign in New Mexico. In this campaign, as in later years, he found his main opposition came, not from the real enemy, but from army officials. Military commanders turned cold at the thought of detaching officers and men from the fighting forces to flop flags and wave torches. To aid him in the Navajo tests, Myer asked for three officers to whom he had given some previous training in signalling. He received none. However, one of the three, Lt. E. P. Alexander, later came to Myer's aid, but in a completely unexpected way.

Major Myer finally received two officers, both inexperienced in signalling. He trained them for a month and entered the field against the Navajos in the country below Zuni. The terrain was rough. Frozen streams cut off the water supply. But the expedition proved that, as an auxiliary in Indian warfare, signalling was successful.

After the expedition Myer asked his men for suggestions or improvements. He moved with his men. He saw what each did and made a note of it. Nothing escaped his attention which might enable the signal system to serve the country. The chance to serve came soon—in the Civil War.

Soon after the war started, Myer opened a school of signal instruction for the Union Army at Ft. Monroe. He ran into two difficulties—getting supplies and trained instructors. One signal officer, on presenting a requisition for horses to the quartermaster, cooled his heel eight hours before receiving them. "Even then," the signal officer said later, "the man acted as if the horses were his private property." The other difficulty was equally serious. When a lieutenant entered the signal service, he gave up all hope of promotion. He was condemned to stand still, although performing hazardous acts with brilliant courage.

Separate Service Fight

Myer knew that brave men readily accept a position of danger when it becomes a necessity, and reward is never the consideration anticipated. But few desire to risk their lives when it is a certainty that all honors will accrue to others. The solution lay in the organization of the signal service on an independent basis, with its own table of organization and ratings. This Myer set out to do. Here, again, he met with opposition. High officers claimed the service and its men had too much independence as it was.

One general in command at the upper Folly Island happened along just as a signal officer was calling the steamer *Mary Benton*. The general asked the lieutenant what he was signalling. The lieutenant said he was saying a few words to a Lt. Town.

"What are you going to say to him?" asked the general.

"That some signal stores have arrived at Pawnee Landing, sir."

"Well, that's all right," said the general, "but you mustn't send any messages without submitting them to me for approval. You must give me a copy of all the messages you receive."

Courtesy, Field Artillery Journal

The lieutenant explained that he was not allowed to disclose the content of official messages, except to the parties to whom they were addressed and the Chief Signal Officer.

"What!" cried the general. "Do you think that you, only a lieutenant, are going to dictate to me, a general? Go to your quarters in arrest!"

On another occasion, a lieutenant on General Burnside's staff rode up to a signal headquarters. He jumped off, handed the reins to a flagman, and said, "Orderly, hold my horse."

"No orderlies here, sir!" said the flagman, saluting.

"And what are you an officer or a man?" asked the surprised officer.

The flagman stared straight ahead. "A man, sir!"

The enraged lieutenant reported the matter to General Burnside, who went to the Chief Signal Officer. The flagman was put on the unassigned list. This deprived him of his horse, so he asked to be returned to his regiment. The signal service had lost another good man.

Confederates Aid

The situation grew worse before it was solved. The answer came in the very early morning. A man stood at his station on a hill near Union Mills Ford, watching the flag of another station at Stone Bridge. Suddenly, the man tensed as the gleam of polished brass field pieces caught his eye. Observing more closely, he saw an enemy column crossing Bull Run in the open field north of Sudley's Ford. It was fully eight miles away, but he could tell it was an attempt to flank the Confederate forces. The observer, by waving his flag, warned Confederate generals, who hurried in that direction. They successfully delayed McDowell, the Union general, until the tide of the first Battle of Bull Run was turned by the arrival of troops in the afternoon. The man on the hill near Mills Ford was E. P. Alexander, the same young officer Albert Myer had trained in signalling.

At the outbreak of the war Alexander reported to Jefferson Davis, who refused several applications for him by officers of different departments. Davis gave Alexander a free hand to organize and introduce a signal service into the Confederate army.

Union officers realized the importance of a well-organized, stable signal service after Bull Run. Officers who had once called Myer a flag-flopper now asked for signal officers. That was the way Alexander helped his former teacher.

Myer supplied as many trained signal officers as possible. However, he was still plagued by one thing—the withdrawal by generals of men detached to him. To end this practice, Myer drew up a plan for the organization of the signal service on a permanent basis. It failed to pass Congress. The objection was that a new and expensive addition would be made to the army which would not be warranted after the war was concluded.

Undaunted, Myer wrote Secretary Stanton in April 1862, and urged him to support the bill in Congress. It passed the House but was postponed indefinitely in the Senate. Major Myer sent another letter to Stanton in January 1863, informing him that the Confederate Congress had organized a permanent Signal Service. "The contest," Myer wrote, "is not a fair one."

Then success came. In the last hours of the 37th Congress, the Signal Corps was organized on a permanent basis for the remainder of the war. On September 18, 1863, Myer was appointed Signal Officer of the Army with the rank of Lt. Colonel.

Barely two months later a crushing blow was delivered to the man who had fought so hard through the years. He was ousted as the head of the Corps which he had created!

Retired

Myer's downfall grew out of his desire to extend the services performed by the Signal Corps. After the Battle of Bull Run, unit commanders were quick to realize the value of good communications. They asked Myer to string telegraph lines between their units which could not be reached by his torch and flag signals. This Myer proceeded to do, stringing 5,000 miles of lines on a small budget. The telegraph lines proved successful after Union soldiers realized what they were. One soldier was found cutting away at a line. When asked what he was doing, he said he thought it was some "infernal rebel machine" and that he was cutting off little pieces to send home as souvenirs.

The lines were not popular in other quarters. To combat this, Myer sent all signal officers a circular in which he stated that an attempt was being made to throw the management of the lines into the hands of a private telegraph company. He urged all officers having control of lines to maintain their rights to that control.

As a result, Myer was ordered before the Secretary of War. The Secretary retired him to Cairo, Illinois, to await orders. He spent the remainder of the war as Signal Officer of the Division of the West Mississippi. Another man might have given up, but not Albert Myer. He wrote a friend, "I am hard at work but making little progress. Never mind: secretaries are not immortal." Part of this work included the writing of his *Manual of Signals*, published in 1866.

As early as January, 1865, Myer began his battle to be restored to what he considered his rightful position. He wrote the Senate, President Johnson, and Generals Grant, Sheridan, Sherman, and Thomas, showing his connection with the origin and development of the Corps, stating his grievances, and asking for simple justice. Most of the generals, remembering the service rendered them by Myer's flag-flopping, came to his aid.

Finally Recognition

Four years after being demoted Myer won the battle. In August, 1867, he again assumed charge of the Corps. Almost immediately, Myer began working out a course of usefulness for the Signal Corps in peacetime. For some years prior to the Civil War, the Smithsonian Institute had issued weather predictions and storm warnings based on telegraphed weather reports. A fire prevented them from resuming the practice, so Myer proposed that the Corps enter the field of weather reporting.

Myer's plan passed Congress in 1870. On November 1 of that year, for the first time in the history of meteorology, simultaneous observations and simultaneous reports were issued from twenty-four stations over the United States. From this beginning our present day bureau developed.

"Old Probabilities," as Myer came to be called during his ten years as head of the bureau, represented the United States at Meteorological Congresses in Vienna (1873) and Rome (1879). He succeeded in his efforts to establish a uniform system of simultaneous meteorological observations the world over. He received the rank of Brigadier General in 1880, a few weeks before his death.

It was during these last weeks that an anxious friend urged him to take a rest. Myer's reply summed up his entire life. He said, "What rest would it be to me if I left my work unfinished?"

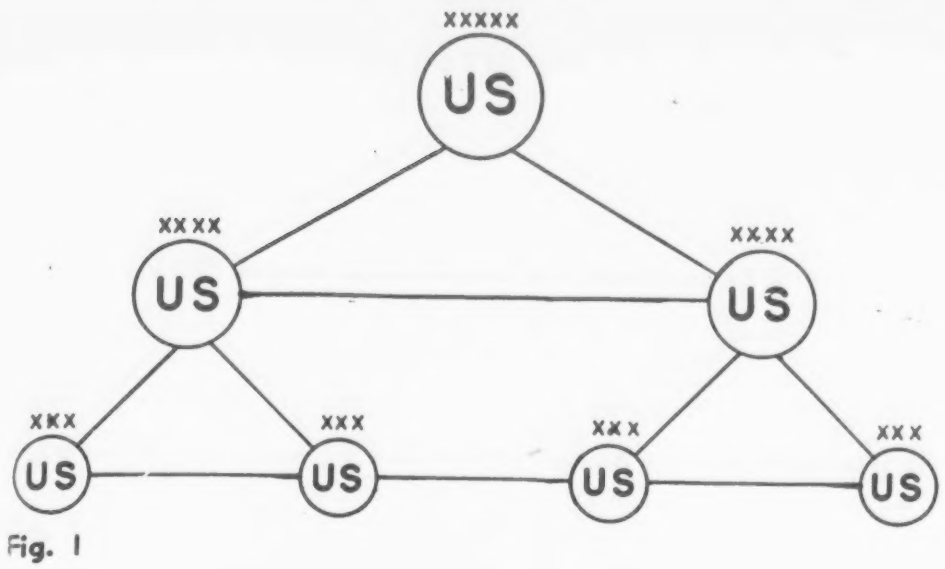


Fig. 1

This article by Major Hewitt is especially timely in view of the recent acceptance of the North Atlantic Security Pact by our Congress.

SIGNAL DIPLOMATS

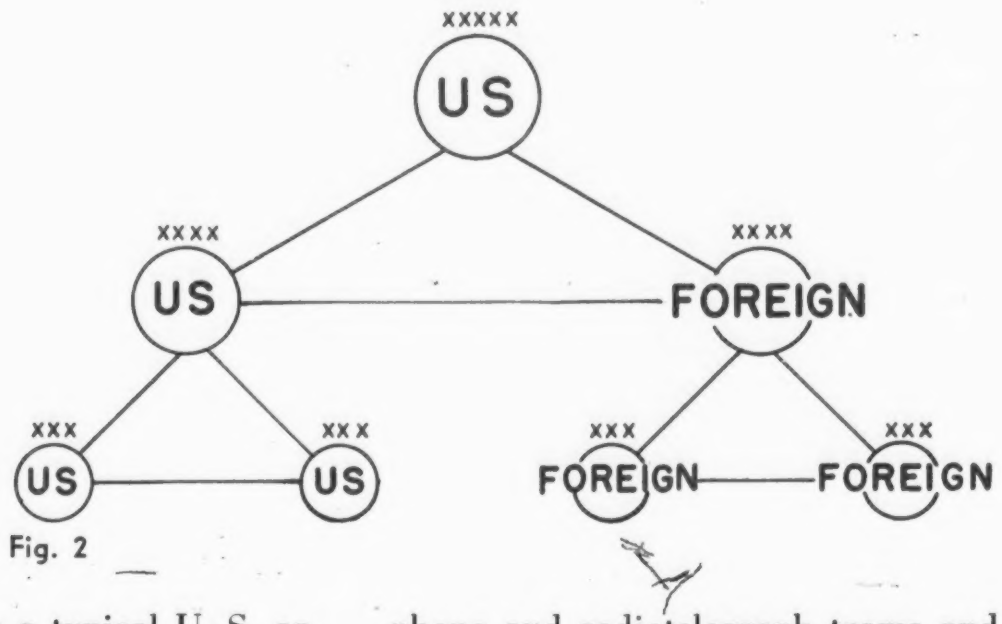


Fig. 2

By Major M. L. Hewitt

In any future operations in which United States ground forces may be engaged there will undoubtedly again be foreign armies with which it will be necessary to establish all the usual channels of communication. Most probably these channels will be from a U. S. army group to the foreign army, and from U. S. armies on the flanks of the foreign army. This will present several unusual communications problems: first, a language barrier; second, differences in operating procedure, differences in cryptographic systems and equipment, and differences in electrical communication equipment.

Therefore, it will be necessary to supply a U. S. signal detachment to the foreign army or to supply foreign signal detachments to the U. S. army group and to the contact U. S. armies. Obviously, it is better to supply the one U. S. signal detachment to the foreign army. Also, with the foreign army there will normally be a U. S. liaison group which will require communications. Thus, the signal detachment will have two missions: first, to act as a funnel for all information between various U. S. headquarters and the foreign army; and second, to service the U. S. liaison group.

Figure 1 shows a typical U. S. army group with two U. S. armies. Figure 2 shows a U. S. army group operating with one U. S. and one foreign army. The important difference is lack of a link between the U. S. and foreign contact corps. A skeleton link may exist; but a good communication channel is impossible because of the differences in language, communication procedures, and equipment. Therefore, it is necessary that an extremely good communication system exists between the contact corps and their respective armies, and between the two armies. Thus, the signal detachment is not only the link for command traffic between the U. S. army group and this foreign army, but must carry liaison traffic between the contact armies, corps, and smaller units.

The signal detachment should have the normal means of communication ordinarily used by and between army group and army. That is, messenger, telephone, teletypewriter, radio, and, if the situation requires, radiotelephone and radioteletypewriter. Also, the detachment should have the cryptographic systems and equipment required at army level. When it is necessary to have wire construction teams working in the foreign army area, they may be temporarily attached to the signal detachment. They should not be an organic part thereof, because there will be many times when they are not needed and might be idle. The same is true of the radiotelephone and radiotelegraph teams and equipment which should be supplied from army group as the situation requires.

The signal detachment must be prepared to operate in two or more echelons as the tactical employment of the foreign army dictates. Temporarily it may be possible to service only the main operational echelon, making it necessary to request the foreign message center to service the other echelons. This solution poses one very difficult problem because the U. S. liaison group will normally be in the same number of echelons as the foreign army, and thus, a substantial portion of our liaison group may be without U. S. communication service. If the foreign army operates continuously in more than one echelon, it will probably be in one or two tactical echelons and one supply echelon; and the U. S. liaison group will be evenly distributed. It is imperative that the signal detachment be large enough and have sufficient equipment to operate in at least two echelons indefinitely.

In the performance of its duties as a channel of communications from the U. S. headquarters to the foreign army, a decision must be made as to the language in which messages are to be exchanged between the U. S. and foreign message center. It is recommended that this be English, and that the foreign headquarters provide translation. The foreign headquarters will be the larger, and it is

always desirable to keep liaison detachments as small as possible for administrative and logistical reasons.

One of the difficult communication problems is operation of the telephone switchboard. This board must switch all traffic between any echelon of the foreign army and the U. S. forces, and it is, therefore, a critical link. The operators must be bilingual and familiar with both the U. S. and foreign traffic procedure and diagrams. Although the foreign headquarters may supply English-speaking telephone operators at the positions connected to the U. S. signal detachment, it will still be necessary for the U. S. operators to speak with foreign operators at subordinate headquarters. Also, some of the subscribers in the U. S. net, as well as some of those in the foreign net, will not speak English. It is recommended that the army group signal officer request that telephone communications to the foreign army be held to a minimum. First, because no foreign army has an extensive telephone net; and, second, because of the danger of misunderstanding.

The wire section of the signal detachment can be expected to do local installation only. Wire construction to the foreign army should be from the U. S. headquarters regardless of normal (from right to left) responsibility. Foreign army communication systems are not as elaborate as our own, and the wire net will be inadequate by our standards unless we build it.

An unusual cryptographic problem is that all electrically transmitted messages to and from the foreign army must be paraphrased. This must be done to safeguard U. S. cryptographic systems from compromise. This places a heavy burden on the cryptographic clerks.

Linguists Needed

The message center and cryptographic personnel should, if possible, be familiar with the language of the foreign army. This is valuable because the foreign message center will frequently forward messages which have lost their meaning through faulty translation. If the message center clerks are familiar enough with the language, they are able to reconstruct the original meaning; and, after check and confirmation, substitute the correct English translation. The knowledge of the language is also useful to the cryptographic clerks in the paraphrasing of messages to the foreign army because messages must be put in such a way that their exact and clear meaning will not be lost in translation.

In order to save time and personnel, the U. S. signal detachment must always insist that its message center be placed as close as possible to the foreign message center. The delivery of messages to the U. S. liaison group is difficult. Messengers must deliver these messages direct to the addressee and must not pass them through the foreign message center. There are two reasons for this: first, U. S. officers will demand a U. S. standard of service; and second, certain information must be kept entirely in U. S. hands. This is a problem because a relatively small signal detachment is serving a liaison group that is scattered through the area occupied by a full army headquarters. It is recommended that the liaison group not establish a message center to service traffic, except for its own administration. Unless this practice is followed, there will be duplication of personnel in the liaison and signal detachments and an unnecessary delay in the delivery of messages.

Liaison Imperative

It is imperative that the signal detachment commander and the other officers establish and maintain close liaison with the headquarters commandant and Signal Corps or message center personnel of the foreign army. This is necessary because the headquarters commandant allocates space, and the signal detachment must have a favorable location. Also, it is necessary to work continuously and harmoniously with the foreign message center personnel, who may not be Signal Corps personnel.

Normally, the signal detachment may be expected to be the only U. S. detachment other than the liaison group operating with the foreign army headquarters. There may be exceptions to this if the organization of the foreign army is such that it is particularly deficient in certain units which it is felt necessary to provide from U. S. forces. Possible attachments to a foreign army are bomb disposal squads, antiaircraft, radar, and certain types of army artillery. However, even if such units are present, the Signal Detachment will probably be the only unit right within the foreign army headquarters.

The signal detachment will have several noncommunication problems. One of these will be supply. There are two solutions to this. The first is to draw upon the foreign army supply system for rations and other available items. The second system is to draw all rations and supplies from the closest U. S. supply points. The second system is recommended, because it will avoid all chance of friction with the foreign army. For the successful completion of its mission, friction must be avoided. Also, from a morale point of view, U. S. rations and supplies are needed for U. S. troops. This will necessitate keeping a supply truck on the road at all times.

The signal detachment will also find that it is obligated to run a mess for a certain number of transients. The U. S. liaison group will have a very small enlisted staff and normally will not be able to accommodate transients. Visiting U. S. officers may eat with the U. S. liaison group or with the foreign staff, but drivers and other enlisted personnel will come to the signal detachment.

Must Be Self-Sufficient

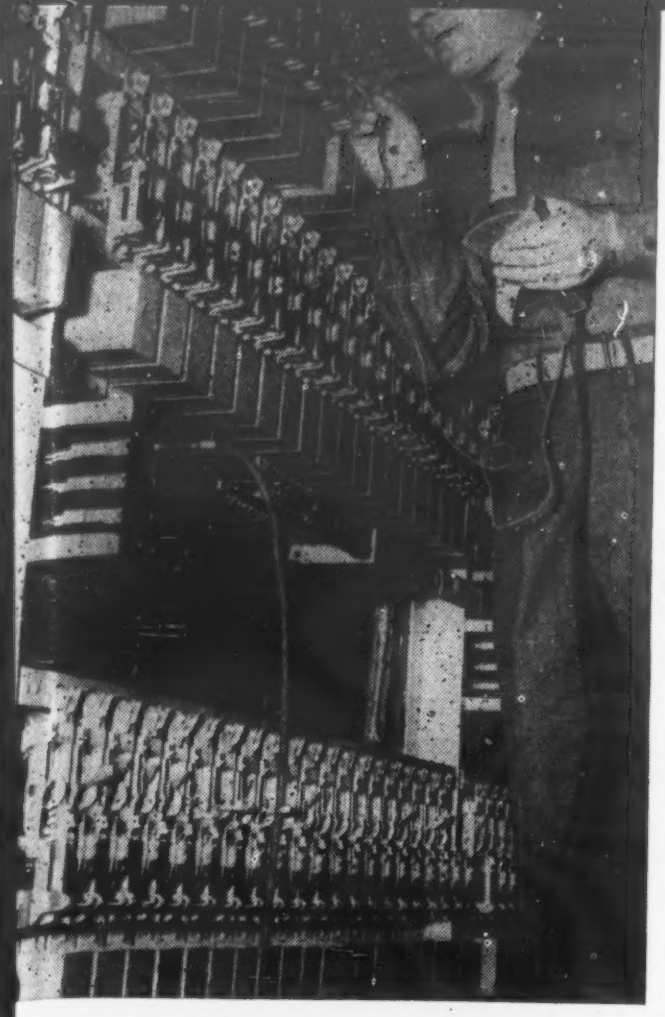
The signal detachment must not only be small but also self-sufficient. That is, this detachment must not only contain communication personnel but must also have a certain amount of administrative and logistical support. There should be a small supply, clerical, automotive repair, and medical staff. This staff may consist entirely of noncommissioned officers.

Administratively, the signal detachment should be a separate unit directly under U. S. army group headquarters. The signal detachment will normally operate at too great a distance from other signal units to be properly controlled by them. The detachment commander must have the authority to make the same decisions as the signal officer or signal battalion commander at army group. On a smaller scale, the detachment commander's responsibilities and problems are similar, except for wire construction.

The officer and enlisted personnel of this signal detachment should be carefully selected. Due to the limited number, all officer and enlisted personnel must know several jobs. It is impossible to measure the importance of the signal detachment. On it rests the responsibility of being the connecting link in the command, control, and coordination of an entire army. The signal detachment must perform its mission in an efficient manner or the fighting force of an army is lost to the army group commander.

1st SIGNAL TROOP IN TOKYO

Prepared by Public Information Office, Headquarters, 1st Cavalry Division



Frame room of dial exchange maintained by 1st Signal Troop, Tokyo.

"Nerve center of the Cavalry Division"—the 1st Signal Troop is often called. And rightly so, for this small body of men, less than 200, have been operating the intricate communications system of the 1st Cavalry Division almost flawlessly for more than three years, in 10 widely scattered prefectures of occupied Japan.

In carrying out their mission there have been, and still are, many obstacles. Travel is made difficult by mountainous Japanese terrain and poor roads, equipment is scarce, and Japanese communications equipment on hand is inadequate. But in spite of such handicaps these trained technicians have built a web of contact that includes radio, teletype and telephone, giving the 1st Cavalry Division direct contact with all higher and lower Headquarters in Japan.

1st Signal headquarters are maintained at Camp Drake, division headquarters near Tokyo. For more than 27 years this troop has been assigned with the 1st Cavalry. It is presently under the command of Lt. Col. Rolla D. Pollock. Colonel Pollock was a signal equipment engineer in civilian life. He entered the Army July 18, 1940 and has been with the Signal Corps since then.

The radio section, located in the division command post, maintains contact with headquarters of other units in Japan. Years ago radio was an integral part of communications, and still is when soldiers are in the field, but radios are rapidly being replaced by teletypewriter machines. These machines are preferred because of their speed, exactness, and clarity. The radio section also maintains and services all teletypes through the division. Code is used only in classified messages and all are of military nature.

Very high frequency radio telephone communications are maintained by the 1st Signal Troop. This set of instruments, combining the radio with the telephone, saves thousands of dollars in expense yearly. V.H.F. works on the principle that a conversation is spoken into a telephone, directed through a switchboard and taken by high frequency radio waves to a receiving station. From this station it is piped into a local switchboard, and to the desired party. This is completed in a few seconds.

Training films also come under Signal in the 1st Cavalry Division. A stock of 2,000 films, averaging 45 minutes in running-time, is kept at Signal headquarters. The films, of 16 mm variety, were shown more than 4,000 times during a two month training period last year.

In the wire operations section the working parts of the dial telephone systems are kept. This modern dial system, based on the Bell Telephone system, was accomplished by Japanese labor, under the direction of Colonel Pollock. It is a 1,000-line system, with a present strength of 650 dial phones. Six operators handle more than 10,000 calls daily, plus an additional 1,000 routed through the switchboard. A constant enemy to this dial machinery is dust, and consequently two vacuum cleaners are kept on hand. Conversation can be held with Korea, a thousand miles distant, through the Camp Drake phone system.

A wire construction crew of 26 men is kept constantly on the alert in case of damage to communications equipment, or disaster. When the 1st Cavalry goes on maneuvers this wire crew maintains constant contact between maneuvering units in the field. In time of disaster, such as floods, the men have been known to work on an average of 16 to 24 hours daily.

The troop is constantly supplied with competent, experienced personnel. This is partly accomplished by the division radio school. The school teaches a class of 80 men in a course lasting 14 weeks. They are taught to send and receive International Morse code, radio procedure, table nets, field work, sets and equipment, and first echelon maintenance on all signal equipment. Signalmen also receive valuable experience by "in the field work." When the division command post goes on maneuvers, it is the Signal Troop's job to keep the command post in constant touch with units in the field.

When the great flood swept over the Kanto plain in late 1947, the 1st Signal Troop laid field communications—both land and air—which resulted in the timely evacuation of thousands of imperiled Japanese throughout the flood area. High praise was bestowed upon these men by then Premier Tetsu Katayama.

In a highly equipped combat unit, radios play an important role. More than 2,000 radio sets are used by the 1st Cavalry Division when in the field. The men in repair have a busy job keeping them in top-notch working shape. Moisture is the enemy of radios, so a moisture and fungus proof plant is installed in the repair shop. After a set is repaired and dried, it will last for two years in the elements.

Troopers of the 1st Signal Troop are proud of their modern equipment and up-to-date methods of communication procedure. The majority of officers and section chiefs are men who have had experience with communication organizations in civilian life.

At a recent division inspector general inspection the 1st Signal Troop was awarded a superior rating. Five individual commendations were presented to section leaders for outstanding performance of duty.

THE SIGNAL CORPS BOARD

By Col. T. J. Tully

SC Board Executive Officer

One of the most important and unusual agencies of the Chief Signal Officer of the Department of the Army is the Signal Corps Board, set up to consider and advise on such subjects as he may refer to it from time to time. It constantly surveys Signal Corps activities with a view to keeping Army communications as modern and up to date as possible.

The Signal Corps Board is located at Ft. Monmouth, New Jersey, where it has the advantage of proximity to the main Signal Corps training center, as well as to the research and development laboratories. It is also reasonably close to the Office of the Chief Signal Officer in Washington and several typical field operating agencies in the middle Atlantic and southern states.

The board was established in June, 1924, consisting of the commanding officer of Ft. Monmouth as president and certain heads of key activities at the post who assisted the board in addition to their normal duties. The first president of the board was Lt. Colonel J. E. Hemphill. From the very beginning the board was intended to provide the Chief Signal Officer with a group of officers relieved of day-to-day operational duties so that they could devote their full time to objective examination and study of the problems relating to modern signal communications.

Between 1924 and 1938 about 250 studies were completed by the board on a wide range of subjects. Several studies were responsible for important changes in communication procedures, the development of signal equipment and for expanding the direction of Signal Corps interests. For example, Case No. 13, 2 April 1925, "Organization of Radio Amateurs," proposed the first blueprint of cooperation between the Signal Corps and the American Radio Relay League, as well as the organization of radio amateurs by the Signal Corps on a national basis for utilization in time of emergency.

Case No. 163, 10 August 1931, "Signal Corps Recruiting Standards," was the first major study by the Corps of the minimum qualifications necessary in a recruit to learn the installation, operation and maintenance of signal equipment.

Case No. 198, 3 August 1934, "Military Characteristics of Carrier Systems and Switchboards for Large Units," was one of many studies by the Signal Corps Board to keep the Army abreast of the latest commercial developments in wire and their applicability to military signals.

Case No. 292, 8 November 1938, "Revision of Tables of Organization of Pigeon Company, Radio Intelligence Company, and Construction Battalion, Signal Corps," carried recommendations to improve the organization of these units. This illustrates the continuing concern of the Signal Corps Board to improve and expand signal units of every type.

In 1938 the organization of the Signal Corps Board was altered to include an executive officer and several full-time board members because of the workload that had been accumulating. The commanding officer of Fort Monmouth remained ex-officio president of the board. The first executive officer was Lt. Colonel George L. Van Deusen, who was to become the commanding general of the Eastern Signal Corps Training Center for most of World War II. Members of the Signal Corps Board who later became Chief Signal Officers are Major General James B. Allison, Major General Dawson Olmstead, Major General Harry C. Ingles.

During World War II, field testing became the primary function of the Signal Corps Board. Tests were made on various Signal Corps equipments being manufactured by commercial firms to determine whether they conformed to the required military characteristics and specifications. The equipments were studied for possible improvement and any recommendations were included in the reports. The board also conducted tests on standard commercial articles to determine whether they could be adopted for use in the Signal Corps.

Tests were conducted by the Signal Corps Board on radio and radar equipments; telephone instruments; radio and telephone components; two-wheel cargo trailers for carrying Signal Corps equipment; earthborers for laying cables; flashlights; and even general-purpose pocket knives. In addition, the board set up many of the required military characteristics on equipment for Signal Corps field use, ranging from Signal Corps Board Case No. 472, "Military Characteristics for a Flashlight Suitable for Blackout Use," to Signal Corps Board Case No. 576, "Military Characteristics for a Combined Pole and Cable-Hauling Trailer."

Detailed studies on organizations, practices, and operational techniques continued to be a function of the Signal Corps Board during the War. The board made recommendations to the Chief Signal Officer concerning plans for camouflage of Signal Corps installations and equipment; revision of parts lists for linemen's equipment; the possible advantages of replacement of telephone central office equipment by improved equipment; and many other similar-type studies.

No resume of Signal Corps Board activities during World War II would be complete without mention of the complete cooperation that existed between the Signal Corps Board, the Signal Corps Engineering Laboratories, and commercial research laboratories. Only by such cooperation could the Signal Corps Board have completed so many detailed projects on different types of equipment. Only in this way was it possible for the new and improved Signal Corps items to be made immediately available to the front line troops.

After the war, the emphasis of the Signal Corps Board shifted again to that of staff adviser for the Chief Signal Officer on matters of policy, trends, and organization within the Corps. The board also continued to be responsible for the supervision of tests on equipment used in rear echelons of non-combat zones. Most of the actual service-testing of new field-type Signal Corps equipment is being carried on at the present time by Army field forces agencies. Cooperation and direct liaison exist between the other service boards and the Signal Corps Board on all matters of common interest.

As presently organized, the board is headed by Major General F. H. Lanahan, Jr., who, as Commanding General, Fort Monmouth, is ex-officio president of the board and Colonel T. J. Tully, the senior full time member and executive officer of the board.

In its advisory functions, the Signal Corps Board is now conducting detailed studies on the Signal ROTC, the National Guard, and the Organized Reserve Corps.

In addition to conducting studies on all phases of Signal Corps activity referred to it by the Chief Signal Officer, the Signal Corps Board continuously is studying and reviewing all aspects of Signal Corps activities to ascertain whether they are in step with current military and commercial

SIGNAL CORPS SUPPLY SCHOOL

By Brig. Gen. C. H. Arnold, U. S. Army

Chief, Procurement and Distribution Division, Office of the Chief Signal Officer

With communications growing increasingly complex, the Signal Corps recently modernized its training program for Signal supply officers who will serve in the expanding Army.

At the Signal Corps Supply School, Camp Holabird, Md., officers from both the Regular Army and the civilian components are enrolled for a five-month course designed to fit them not only for supply posts within the Signal Corps, but also in Army Areas and overseas commands. To date, 75 officers have graduated from the school, which has been operated since September, 1946, under the Office of the Chief Signal Officer. Most of them have gone to installations of the Procurement and Distribution Division, Office of the Chief Signal Officer.

Instruction at the Signal Corps Supply School places special emphasis on depot operations, for the depot is beyond question the backbone of the complex Signal Corps supply system. Weeks are devoted to depot instruction, including comprehensive on-the-job training at the Baltimore Signal Depot.

Detailed instruction also is provided on Signal Corps procurement and Signal Corps stock control, including practical training at the agencies in Philadelphia where these activities take place.

The curriculum also covers the organization of the National Military Establishment, procurement procedures, supply requirements, supply control methods, *materiel* identification, overseas requisitioning procedures, post, camp, and station supply procedures, use of supply catalogs and other Department of the Army publications, management engineering, and principles of military instruction.

Courses normally are prepared and delivered by instructor personnel assigned to the school. However, the talent and experience of particularly qualified individuals throughout the Signal Corps supply system are used to great advantage. Such persons are called upon to teach in the sphere of their special qualifications.

In addition to knowledge gained from service personnel and activities, students have profited much from the co-operation of industrial concerns in the vicinity of Baltimore. These firms have permitted tours of their facilities.

Instruction is attuned to the ever-increasing, ever-changing needs of the Signal Corps supply system. It must be flexible in order to cope with developments that arise through experience and research, such as a recent provision for direct issue from depots.

Special projects related to the program of instruction have been undertaken by the school. Sub-courses on supply have been prepared for the Extension Department of the Signal School. Department of the Army examinations in Signal supply have been drafted. Assistance was given the Signal Corps Publications Agency in preparing a field manual on Signal supply. Instruction has been furnished officers other than those assigned to the school.

The school maintains constant liaison with other Procurement and Distribution Division installations, in whose practices, procedures and policies can be found a rich source of reference data for the preparation of practical exercises, problems and school texts.

Expansion of the Regular Army, National Guard and Organized Reserve Corps is intensifying the need for trained Signal supply officers—a need that was anticipated two years ago with the establishment of the school at Camp Holabird. The many new units, training centers and supporting agencies involved in the expansion program that will be of intimate concern to officers now undergoing training. Theirs will be the responsibility of sustaining an old Signal Corps tradition: to get the right supplies to the right place at the right time.

Signal Corps Board

(*Continued from preceding page*)

trends and with existing military requirements. To fulfill these functions efficiently, the board has been divided into five sections: (1) policy and trends; (2) communication systems and equipment; (3) photographic and miscellaneous; (4) personnel and training; and (5) procurement, supply and maintenance.

The policy and trends section is responsible for studies of new strategic and tactical concepts to assure anticipation of new demands likely to be placed on the Signal Corps. Studies on the desirability of the helicopter for Signal Corps use and television training implications are among the current studies and investigations of this section.

All communication systems and equipment currently employed by the Signal Corps continuously are being reviewed by the communication systems and equipment section in order to determine their adequacy and effectiveness in fulfilling the communication mission of the Signal Corps. This section also reviews current and proposed Signal Corps development programs to determine the operational need for the completed item, and studies the latest developments in military and commercial communication systems to recommend possible applications to Signal Corps use.

The photographic and miscellaneous section is responsible for the same type of surveillance as the communication section, but on practices and equipment being developed to fulfill the photographic and non-communications functions of the Signal Corps.

At the present time the procurement, supply and maintenance section of the board is conducting a special study of the existing Signal Corps maintenance system in order to ascertain certain deficiencies revealed during World War II, and to recommend necessary revisions.

Among the officers presently conducting investigations and preparing reports for the Signal Corps Board are: Lt. Colonel C. A. Stanley, Lt. Colonel D. O. Sprankle, Lt. Colonel J. B. Winsted, Major F. Chilton, Captain T. K. Hughes, Captain R. W. Krogel, Captain R. N. McNitt, Captain F. J. Frank, and Captain J. P. Coe, Jr.

By the nature of its activities, the Signal Corps Board welcomes ideas and suggestions from all personnel—military and civilian—interested in the improvement of Signal Corps equipment or in the service of the Signal Corps as a whole. For the role of the board is to observe every phase of Signal Corps activity in the light of new and improved technical developments, and in the light of the ever-increasing importance of signal communications to modern warfare.

ASSOCIATION AFFAIRS

ARMED FORCES COMMUNICATIONS ASSOCIATION

1625 Eye Street, NW, Washington 6, D. C.

DIRECTORS AT LARGE

David Sarnoff, Past President (1952)

Theodore S. Gary (1950)
Carroll O. Bickelhaupt (1950)
Dr. Lee De Forest (1950)
Thomas H. A. Lewis (1950)
Thomas A. Riviere (1950)
Fred R. Lack (1951)
Darryl F. Zanuck (1951)
A. W. Marriner (1951)

C. E. Saltzman (1951)
Leslie F. Muter (1951)
Dr. Frank B. Jewett (1951)
William S. Halligan (1951)
William C. Henry (1951)
E. K. Jett (1952)

Jennings B. Dow (1952)
S. H. Sherrill* (1952)
Thomas J. Hargrave (1953)
R. Adm. Earl E. Stone (1953)
J. R. Cunningham (1953)
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Paul Goldsborough (1953)

OFFICERS

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2nd Vice-Pres.: **Thomas J. Hargrave***
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5th Vice-Pres.: **Carroll O. Bickelhaupt**
Exec. Sec and Treasurer: **Brig. Gen. S. H. Sherrill,* U.S.A. (Ret.)**
Counsel: **Frank W. Wozencraft***

*Executive Committee Member

Membership Awards

Increased influence of AFCA is dependent largely upon the extension of its membership. The most desirable fields for extension can be reached through its own members. Our directors have now authorized an award for individual members who are successful in adding new members to our rolls. The silver emblem of the Association for wear in the coat lapel will be awarded for those who have recurited five new members. Members applying for the award should submit the names of the five new members they have secured. The names of those who win this award will appear on a special banner list in the issue following the award.

Amending Constitution

Our constitution says that amendments to it may be proposed by a majority vote of the Board of Directors or of the Executive Committee or upon petition addressed to the President and signed by not less than 5% of the total number of full members, and further that amendments so proposed shall be submitted to the entire active full membership by letter ballot and shall be adopted if a majority of the votes cast are in favor. You may have a copy of the constitution upon request.

Positions Open

We will be glad to run in our columns requests for "Positions Wanted" or information about "Positions Open" for our members. Such notices will be published free of charge. They should not have more than five lines in a column of the width of this one.

Show Your Colors

Wear the insignia of your Armed Forces Communications Association on your civilian dress or on your uniform at society meetings. You are proud of your Association. Tell the world so by displaying its emblem. See Books & Service Dept. for prices.

Honor Chapter Contest

This new contest is for the greatest number of new and renewed group members in a chapter area. Twenty points will be earned for each $200 group, ten for each $100 group whose applications are received from May 1, 1949 to April 30, 1950.

Life Members

The name of Lt. Col. Ira H. R. Genet should have appeared under the list of AFCA life members in the May-June issue of SIGNALS. Lt. Col. Genet has been a life member of the association since January 30, 1948.

Since the list was prepared, Frank C. Vondrasek, Jr., of Uehling, Neb., formerly a student member of the association, has taken out a life membership.

WHEN DOES YOUR MEMBERSHIP EXPIRE?

Look at the expiration date on your membership card. If it is within 30 days, it's time to pay your dues. Fill in this form and return with the correct remittance. If you do not use the form please pass it on to a friend for his use in applying for membership.

Armed Forces Communications Association
1624 Eye Street, N. W., Washington, D. C.

Enclosed is $_____ for membership (new (renewal) for one year in the AFCA
(Full—$5.00) (Retired or Enlisted—$3.00) Student ($2.00)

Name _____

Address _____

City _____ State _____

Dwight Palmer's Warning

In his introductory speech, as toastmaster at AFCA's 1949 annual banquet, Dwight R. G. Palmer, president of General Cable Corporation, who has for many years aided the nation in industrial planning and procurement problems in connection with communications material for national security, asked if we are duly conscious that, while aggression—the menace from without—is being girded against by the North Atlantic Pact (recently approved for the United States by the Senate), there is yet another menace—possibly an even greater one. Thinking Americans should consider his warning, expressed so soberly and so forcefully to his audience when he said:

"Few will deny that Totalitarianism • gains a foothold most easily when and where Democracy is off guard. What constitutes a favorable condition for the growth of that ideology which attacks the foundations of our Democracy?

"While we gird ourselves under the North Atlantic Pact against aggression from without, what are we doing to protect ourselves within our gates? The 'stranger within' is not any one individual. The 'stranger' is not any one group of antagonists. In every place in our land—in industry, in labor, in the marts of trade, in our educational institutions, in our civic and national activities, in our homes, in our services, in our churches—in every walk of life there is this 'stranger.' Who is he? What is he? Self-interest, self-satisfaction, injustice, inequality of opportunity, intolerance, discrimination—these are the strangers!

"Mind you . . . we cannot saw off any segment of our citizenry without throwing it into the arms of the enemies of Democracy!

"Today, self-interest, self-indulgence, greediness, discrimination for our own selfish ends, all are indications that the 'stranger' is gathering strength—gnawing at our roots and despoiling the principles for which we have fought and which we shout we stand for! If 'Me First' is to be the new slogan of this Democracy, if treading on the necks of those less fortunate than we is to be the order of the day, of what value then is the blood that has been spent in the cause of freedom?

" 'What is a man profited, if he shall gain the whole world and lose his own soul?' In our nation's life, the question is—'What profit us if the North Atlantic Pact is a great success but we have failed to do the job inside our boundaries?'

"President Truman, our distinguished Chief Executive, has done his job in giving us the North Atlantic Pact. How long will it be before you and I as American citizens will be about our job?"

National Advisory Committee Chairmen

BATTERY MANUFACTURING: **Dr. George W. Vinal, Bureau of Standards, Washington, D. C.**

DRY BATTERY SUBCOM.: **Mr. Ralph E. Ramsay, V. Pres. & Research Director, Ray-O-Vac Company, Madison, Wisconsin**

STORAGE BATTERY SUBCOM.: **Mr. L. E. Wells, Chief Engineer, Willard Battery Company, Cleveland 1, Ohio**

PHOTOGRAPHIC EQPT. SUBCOM.: **Mr. H. A. Schumacher, V. Pres., Graflex, Inc., Rochester, N. Y.**

PHOTOGRAPHIC SENSITIZED MATERIALS & CHEMICALS: **Joseph C. Wilson, Pres., The Haloid Co., Rochester, N. Y.**

PUBLICITY: **Mr. Orrin Dunlap, Jr., RCA, 30 Rockefeller Plaza, New York 20, N. Y.**

MILITARY TRAINING: **Major Gen. G. L. Van Deusen, Pres., RCA Institutes, Inc., 340 West 4th St., New York 13, N. Y.**

CCAFA

The Coordinating Committee of Armed Forces Associations is preparing plans for the first Industry-Armed Forces Day regional meeting expected to be held in Washington, probably in October. The national headquarters and the Washington chapters of the thirteen associations will make the arrangements. It is hoped that Secretary of Defense Johnson will be the principal speaker. The recently elected president of AFCA's Washington chapter, Francis H. Engel, will head up one of the committees on arrangements. Col. Ludlow King, chairman of CCAFA, will be in general charge of the meeting, full details of which will be covered in a special joint information letter to be sent out when final plans are complete.

Addresses Unknown

Mail addressed to the following members has been returned to us. If you know the present address of any of them please send us a card.

Capt. Rochard R. Alrdidge
Capt. Harold W. Athan
Maj. William J. Augustine
T/4 Thomas V. Bloomfield
Capt. Charles C. Britton
Charles W. Brown
Pfc. David M. Dixon
Capt. Richard J. Dunn, Jr.
Capt. John J. Evans
1st Lt. Ralph L. Fisher
Maj. Edward R. Flynt
1st Lt. Richard C. Glenn
Lt. Gaudencio V. Guyot
Edward L. Holshouser
Lt. Robert L. Howell
Rudy H. Kawahara
1st Sgt. James A. Kempton
Lt. Col. Victor T. Lyncy, Jr.
Lt. Harvey S. Leeds
John S. Mehring
1st Lt. Donald E. Moreland
T/3 William E. Murphy
Gerald A. Murray
Capt. Martin Newcomer
Foster F. Oliver
Sam H. Perkins
Lt. Edison H. Schofield
Capt. Michael E. Seyster
Corp. James H. Simon
Capt. John F. Smith
M/Sgt. V. W. Strauv
Capt. George M. Strawn
Maj. Harry E. Tabor
John W. Thingvold
Capt. Frank Witry
William T. Wofford
John H. Wilson
Maj. Charles L. Wright

Annapolis Prize Winner

Midshipman William Littell Bryan of Clarks Green, Pa., was the recipient of AFCA's first annual award at the Naval Academy to the member of the graduating class who ranked highest in the study of electronics. The prize consisted of an Eastman-Kodak camera, a scroll, and one year's honorary membership in the Association. Mr. Walter Evans of Baltimore, newly elected AFCA National Director, made the award at the dress parade of the brigade on May 31st.

West Point Winner

The second annual AFCA award at the Military Academy to the member of the graduating class who excelled in electronics was won by Cadet Paul Crowther Dow, Jr., of Rockport, Mass. The prize, similar to the one made at the Naval Academy, was presented to Cadet Dow by Mr. Fred R. Lack, AFCA National President, at the review of the Corps of Cadets on June 5th.

1949 ROTC Medal Winners

The AFCA medal was awarded to the outstanding ROTC student at 17 colleges where training is given in communications by the Army, Navy

and/or Air Force. The purpose of the award is to stimulate greater interest in military communications, electronics and photography among young Americans preparing for military service. In addition to the special medal for wear on the ROTC uniform, the winners received a scroll and an honorary membership in AFCA for one year.

This year's winners were:

A&M of Texas—Francis R. Lengefeld of Gatesville, Texas. Cadet Lt. Col. Lengefeld, Communications Officer for the Corps of Cadets, is a distinguished military graduate and has been offered a Regular Army commission.

Clemson Agricultural College—John B. Berry, Jr., of Dunwoody, Ga.

Cornell University—Warren S. Messner. The presentation was made on May 19th at the review of the Cadet Corps during the annual formal inspection by the Department of the Army.

Georgia Institute of Technology—Leroy L. Williams, Jr. The president of AFCA's Atlanta chapter, W. H. Mansfield, presented the award.

Iowa State College—Edward L. Shideler of Ames, Iowa. Cadet Major Shideler was awarded the medal at a regimental review on May 19th.

Kansas State College—Cadet 1st Lt. Howard D. Akins of Abilene, Kansas.

Massachusetts Institute of Technology—Louis A. Morton of Union City, N. J. The medal was presented to Cadet Capt. Morton by Maj. Gen. Frank J. Keating, Commanding General of the New England Military District, during a parade held on May 5th.

Michigan State College—John W. Main of East Lansing, Michigan. The award was made on May 17th at a formal review of the Cadet Corps.

New York University—Arthur E. LaPorte, Jr., of Forest Hills, N. Y. The medal was presented to Cadet Lt. Col. LaPorte during the annual Field Day activities on May 13th by Col. George P. Dixon, president of AFCA's New York chapter.

Oklahoma A&M College—Chester R. Richey, Jr., of Pawhuska, Oklahoma. The award was made at the military convocation on May 17th.

Rutgers University—Vincent J. Romano of Bound Brook, N. J. The medal was presented to Cadet Lt. Col. Romano during the annual military field day exercises by Maj. General Roscoe B. Woodruff, Deputy Commander, First Army.

State College of Washington—Terrence S. Meade of Pullman, Wash. and Robert B. Patton of Clarkston, Wash. Governor Arthur Langlie of Washington awarded the medals at the Memorial Day parade on May 29th.

Texas Technological College—Re N. Brown of Lubbock, Tex. The presentation was made on May 12at th annual ROTC formal inspection.

University of Alabama—Robert Rushing of Tuscaloosa, Ala. Cade Lt. Col. Rushing is a veteran of fou years service during the war. H commands the 2nd Battalion of th ROTC Regiment and intends to app for a Regular Army commissio upon graduation. The AFCA med was presented to him by the Gove nor of Alabama on May 19th.

University of California—Willia M. Mueller of Alameda, Calif.

University of Maine—Theodore Littlefield of Brewer, Maine.

Virginia Polytechnic Institute— William T. Miller of Richmond, V The award was made at a full dre parade of the Corps of Cadets June 11th. Cadet Supply Sergea Miller was also designated Disti guished Military Student in the cla of 1949.

TREASURER'S REPORT

Our total assets are much increased over June 30, 1948. At the same time, $4,100.75 has been paid to chapters as their share of national dues. This increase in assets is due to increases in the number of group members, of subscriptions to libraries and of advertising which, together with economies at national headquarters, have more than balanced the slight decrease in individual members during the year. Since our association does not enjoy the secure position enjoyed by other associations which have accumulated a substantial reserve during their longer period of existence, it is satisfying to be able to report substantial progress toward creating such a reserve to "carry us" if we should ever be forced for a time to operate at a loss. An auditing committee, consisting of Col. Roland Stafford, USA(Ret.) and Mr. James D. Durden, CPA, completed the audit on July 16.

FINANCIAL STATEMENT

Fiscal Year Ending 30 June 1949

ASSETS

Current Assets:		
Cash:		
Petty Cash	$ 25.00	
Cash—Checking Account	11,319.91	
Cash—Saving Account	3,070.32	
U. S. Government Bonds	10,000.00	
Total Cash		$24,415.23
Accounts Receivable:		
Advertising	$ 600.00	
Advertising Contracts	4,395.04	
Subscription Contracts & Misc.	1,060.39	
Total Accounts Receivable		6,055.43
Total Current Assets		$30,470.66
Prepaid Expenses:		
2nd Class Permit and Rent Deposits	$ 218.55	
Prepaid Insurance, etc.	114.40	
Total Prepaid Expenses		332.95
Fixed Assets:		
Furniture & Fixtures (net)	$ 1,339.28	
Library	43.81	
Total Fixed Assets		1,383.09
Total Assets		$32,186.70

***Includes $16,732.56 renewals for FY 1950 memberships and advertising contracts.**

LIABILITIES AND NET WORTH

Current Liabilities:		
Accrued Wages	$ 198.65	
Accounts Payable—Chapters and Trade Crs.	934.00	
Accrued Commission Expense Payable	82.30	
Advancements Received for Orders Placed	1.50	
Accrued Luxury Tax	1.34	
Total Current Liabilities		$ 1,218.79
Unearned Dues and Surplus		30,967.91
Total Liabilities & Net Worth		$32,186.70

Leaders and Public Attitudes

From an address by Brig. Gen. C. T. Lanham, Director of Staff Personnel Policy Board, Office of the Secretary of Defense before the National Small Business Men's Association.

Three key groups in our country are under ceaseless attack—our representatives in Congress, our businessmen, our military leaders. These three groups are made the butt of endless ridicule; vicious stereotypes unendingly depict them as fools or scoundrels or advocates of the blackest reaction. The fact that complete honest and worthy citizens are occasionally involved in this practice does not disguise the treacherous inspiration nor hide the treacherous intent to undermine confidence in our political, industrial, and military leadership.

We of the military establishment are particularly handicapped by this attack since we cannot strike back. Ouf defense, therefore, must be left in the hands of others. For our part, we have nothing for which to apologize. The professional officers of our Army are justly proud of their service to the American people. Our senior officers find it difficult to believe that their fellow citizens regard them as incompetents, as unscrupulous seekers of tarnished glory, or as heartless and inhuman martinets. We are unwilling to believe that, after a hundred and seventy years, the American people have suddenly come to regard success as shameful and mediocrity as an ideal. For four years, the attempt has been made to drive these vicious wedges between the corps of officers and the civil community. That way lies disaster for any army, any time, anywhere.

It would also be well to remember that a man of ability in a free society will not elect a profession that promises no reward for achievement. Our whole society is based on incentives. Competition and personal initiative have carried us to the pinnacle of the world. Dare we set these aside for the military profession and still expect to attract men of ability or hold those we have? This is a matter of profound concern, now and in the future.

For a considerable period of time we have concentrated almost exclusively on the soldier. Perhaps it is time we gave a little sober thought to the men who may some day have to lead him in battle and upon whose ability and wisdom and judgment his life will depend. Therefore, while we strive to build a more perfect Army about the central core of our way of life, let us remember that such armies are not built by second-rate leaders with second-rate minds. Nor have our wars been won by such men. It is the devout hope of all of us that we may never again be engulfed in war; but if we should be, let us hope that the policies we adopt today will attract to our ranks the Eisenhowers and Bradleys of tomororw.

INDUSTRIAL MINUTE MEN OF 1949

Communications—Electronics—Photography

Listed below are the names of the American firms who are group members of the Armed Forces Communications Association. By their membership they indicate their readiness for their share in industry's part in national security. Each firm nominates several of its key employees or officials for individual membership in AFCA, thus forming a group of the highest trained men in the electronics and photographic fields, available for advice and assistance to the armed services on research, development, manufacturing, procurement, and operation in our special fields.

Acme Telecronix
Admiral Corporation
American Institute of Electrical Engineers
American Phenolic Corporation
American Radio Relay League
American Steel & Wire Company
American Telephone & Telegraph Co.
Anaconda Wire & Cable Company
Arnold Engineering Company
Astatic Corporation
Automatic Electric Company
Automatic Electric Sales Corp.

Baltimore News Post
Baltimore Radio Show, Inc.
Bell Telephone Company of Pa.
Bendix Radio
Bliley Electric Company
Breeze Corporation, Inc.

California Water & Telephone Co.
Capitol Radio Engineering Inst., Inc.
Carolina Telephone & Telegraph Co.
Central Radio and Television Schools
Chesapeake & Potomac Tel. Co.
Chicago Telephone Supply Co.
Cinch Manufacturing Corp.
Commercial Radio-Sound Corp.
Copperweld Steel Company
Cornell-Dubilier Electric Corp.
Corning Glass Works
Coyne Electric School, Inc.

DeJur-Amsco Corporation
Diamond State Telephone Co.
Allen B. DuMont Laboratories, Inc.

Eastman Kodak Company
Hugh H. Eby, Inc.
Electronic Associates, Inc.
Electronic Designs, Inc.
Espey Manufacturing Co., Inc.

Federal Mfg. and Engineering Corp.
Federal Telephone & Radio Corp.
Freed Radio Corporation

General Aniline & Film Corp.
General Cable Corporation
General Electric Company
General Electric Corp.
General Telephone Corp.
Gilfillan Bros. Inc.
Globe Wireless, Ltd.
Graflex, Inc.
Gray Manufacturing Co.

Hallicrafters Company
Haloid Company
Hazeltine Electronics Corp.
Heinemann Electric Company
Hercules Motors Corp.
Hoffman Radio Corp.

Ilex Optical Co.
Illinois Bell Telephone Co.
Indiana Bell Telephone Co.
Indiana Steel & Wire Co.
Institute of Radio Engineers
International Detrola Corp.
International Resistance Co.
International Tel. & Tel. Corp.

Jacobsen Manufacturing Co.

Kellogg Switchboard & Supply Co.
Kleinschmidt Laboratories, Inc.

Lasting Products Co.
Lavoie Laboratories
Leich Sales Corporation
Lincoln Telephone & Telegraph Co.
Link Radio Corporation

Machlett Laboratories, Inc.
Magnavox Company
P. R. Mallory & Co., Inc.
Massachusetts Radio & Telegraph School
Merit Coil and Transformer Corp.
Michigan Bell Telephone Company
Mines Equipment Company
Motorola, Inc.
Mountain State Tel. & Tel. Co.
Mutual Telephone Company

National Carbon Company, Inc.
National Fabricated Products, Inc.
Newport Steel Corporation
New England Tel. & Tel. Co.
New Jersey Bell Telephone Company
New York Telephone Company
North American Philips Co., Inc.
Northwestern Bell Telephone Co.

Oak Manufacturing Co.
Ohio Bell Telephone Co.
O'Keefe & Merritt Company
Okonite Company
Operadio Manufacturing Company

Pacific Telephone & Telegraph Co.
Philco Corporation
Photographic Society of America

Radiart Corporation
Radio Condenser Company
Radio Corporation of America
RCA Victor Division
Rauland Corporation
Ray-O-Vac Company
Reeves Instrument Corp.
Remington Rand, Inc.
Rola Company, Inc.

Servo Corporation of America
Sherron Electronics Co.
Society of Motion Picture Engineers
Sonotone Corporation
Southern Bell Tel. & Tel. Co.
Southern New England Tel. Co.
Southwestern Bell Telephone Co.
Sperry Gyroscope Company
Stackpole Carbon Company
Standard Piebo Company
Stewart-Warner Corporation
Stromberg-Carlson Co.
Stupakoff Ceramic & Mfg. Co.
Sylvania Electric Products, Inc.

Telephone Services, Inc.
Telephonics Corporation
Teletype Corporation
Times Facsimile Corporation
Tri-State College
Tung-Sol Lamp Work, Inc.

United Radio Television Institute
United States Electric Mfg. Corp.
United States Rubber Company

Wm. H. Welsh Co., Inc.
West Coast Telephone Company
Western Electric Company, Inc.
Western Union Telegraph Co.
Westinghouse Electric Corp.
Weston Electrical Instrument Corp.
Willard Storage Battery Co.
Wisconsin Telephone Company
Wollensak Optical Company

Chapter News

National Director of Chapters: Theodore S. Gary, 1033 W. Van Buren St., Chicago, Ill.

AREA REPRESENTATIVES FOR CHAPTERS

Area A: George P. Dixon, IT&T Corp., 67 Broad St., New York, N. Y. New England States, New York, New Jersey

Area B: J. H. LaBrum, Packard Building, Philadelphia, Pa. Delaware, Kentucky, Maryland, Ohio, Pennsylvania, West Virginia and Virginia

Area C: W. H. Mansfield, So. Bell T&T Co., Atlanta Ga. Southeastern States along Atlantic and Gulf coasts—from North Carolina to Mississippi and including Tennessee

Area D: H. L. Reynolds, 1800 N. Market St., Dallas, Tex. New Mexico, Texas, Oklahoma, Arkansas and Louisiana

Area E: T. S. Gary, 1033 W. Van Buren St., Chicago, Ill. Mich., Ind., Ill., Wisc., Minn., Iowa, Mo., Kans., Neb., N. Dak., S. Dak., Wyo., Col.

Area F: H. L. Hoffman, 3761 S. Hill St., Los Angeles, Calif. Arizona, Utah, Nevada, California, Idaho, Oregon, Montana and Washington

Individuals interested in chapter activities should communicate either directly with National Headquarters or with the proper area representative.

CHAPTERS AND SECRETARIES

ATLANTA: Capt. Dewey Allread, Jr., Bldg. 104, Apt. 1, Ft. McPherson, Ga.

AUGUSTA-CAMP GORDON: Maj. Norman J. Kinley, SCTC, Camp Gordon, Ga.

BALTIMORE: E. D. Bond, Baltimore Signal Depot, Middle River, Md.

BOSTON: Lt. Col. Edmund T. Bullock, Boston Army Base, Boston 10, Mass.

CHICAGO: Raymond K. Fried, 111 W. Monroe St., Chicago 1, Ill.

CLEVELAND: T. F. Peterson, 1434 Union Commerce Bldg., Cleveland 1, Ohio.

DALLAS: E. H. Mittanck, Rm. 816, Telephone Bldg., Dallas, Tex.

DAYTON: Gertrude A. Knight, 54 Patterson Village Dr., Dayton, Ohio.

DECATUR: Doris E. Short, 140 No. Hilton St., Decatur, Ill.

EUROPEAN: C. E. Laurendine, Comm. Gp., BiPartite Control Office, Frankfurt, APO 757, New York.

FAR EAST: C. B. Whittenberg, Sig. Sec., GHQ., FEC, APO 500, c/o PM, San Francisco, Calif.

FORT MONMOUTH: Maj. T. J. Palik, Tng Div., T.S.S., Ft. Monmouth, N.J.

GREATER DETROIT: Robert J. Derr, 20038 Pinehurst Ave., Detroit, Mich.

KENTUCKY: Clyde T. Burke, Lexington Signal Depot, Lexington, Ky.

LOUISIANA: A. Bruce Hay, Southern Bell Tel. & Tel. Co., New Orleans, La.

NEW YORK: William H. Harrington, 195 Broadway, New York 7, N. Y.

OGDEN-SALT LAKE: Inactive.

PHILADELPHIA: Joseph Bergman, Sig. Corps Stock Control Agency, 2800 So. 20th St., Philadelphia, Pa.

PITTSBURGH: K. A. Taylor, Bell Telephone Co., 416 7th Ave., Pittsburgh, Pa.

RICHMOND: Lelia V. Fussell, Ches. & Potomac Tel. Co., 703 E. Grace St., Richmond, Va.

RIO: Inactive.

SACRAMENTO: Capt. C. A. House, Sacramento Signal Depot, Sacramento, Calif.

SAN FRANCISCO: J. K. Fairchild, 55 Madrone, Fairfax, Calif.

ST. LOUIS: A. Reid Chappell, 70 York Drive, Brentwood, Mo.

SEATTLE: Clarence C. Bodine, 6812 Phinney Av., Seattle, Wash.

SOUTH CAROLINA: Lt. Geo. A. Frakas, Post Sig. Off., Hqrs., Fort Jackson, S. C.

SOUTHERN CALIFORNIA: K. E. Lambert, MGM, Hollywood, Calif.

SPANISH WAR VETERANS DIVISION: George A. Marshall, Adj., 215 Montague St., Brooklyn, N. Y.

WASHINGTON: Edward C. Cover, Chesapeake & Potomac Tel. Co., 725 - 13th Street, N. W., Washington, D. C.

STUDENT CHAPTERS

CORNELL: John M. Ross, 126 McFaddin Hall, Ithaca, N. Y.

NEW YORK UNIVERSITY: Robert D. Hawkins, 25 Spruce Ave., Ridgefield Park, N. J.

OKLAHOMA A & M: W. D. Manahan, Okla. A & M College, Stillwater, Okla.

STATE COLLEGE OF WASHINGTON: Stuart W. McElhenny, 604 California St., Pullman, Wash.

TEXAS TECH: Raymond D. Self, Veterans Village, Lubbock, Tex.

UNIVERSITY OF CALIFORNIA: R. G. Barhite, Bowles Hall, U. of Calif., Berkeley, Calif.

NATIONAL HEADQUARTERS CHAPTERS SECRETARY: JULIA B. GODFREY

Atlanta—W. H. Mansfield, Pres.

The Air Force's tri-dimensional photography show featured the annual dinner-meeting of the chapter on May 11th. Col. George W. Goddard, officer-in-charge, aerial photographic section, demonstrated the equipment which had been brought from Wright Field. Maj. Gen. Francis L. Ankenbrandt, Director of Air Force Communications, was present as guest of honor and spoke briefly on Air Force communications.

Dan McKeever, retiring president of the chapter, presided as toastmaster. The newly elected officers for the ensuing year were installed as follows: president—W. H. Mansfield, Southern Bell T&T Co.; 1st vice president—Dan A. McKeever of J. E. Hangar Co.; 2nd vice-president—Lt. Col. Hugh A. Vest, 3rd Army Communications; 3rd vice-president—R. J. Jernigan, Atlanta Signal Depot; 4th vice-president—R. J. Klein, Jr., Georgia Tech.; secretary-treasurer—Capt. Dewey Allread, Jr., Fort McPherson.

Chapter Of The Year, 1949

KENTUCKY

President—Murray P. McQuown

Past Pres.—William M. Mack

Secretary—Clyde T. Burke

Among the 142 persons present were: Maj. Gen. William C. Chase, Chief of Staff, Third Army; Capt. E. H. Callahan, USN, Naval Liaison Officer, Third Army; Lt. Col. George H. Kneen, Commanding Officer, Marietta Air Force Base; Hal S. Dumas, Sr., president, Southern Bell T&T Co.; J. G. Bradbury, executive

vice-president, Southern Bell T&T Co.; and Col. W. Q. Jefferds, Jr., PMS&T, Georgia Institute of Technology.

Augusta-Camp Gordon—H. A. Fleming, Pres.

Regular monthly meetings are being held on the third Wednesday of each month. The May 18th meeting was devoted to organizing and planning activities. The interim officers chosen at the last meeting were unanimously elected to serve for the balance of the year. Lt. Col. Harold F. Osborne of Camp Gordon was added to the slate as 2nd Vice-President. The constitution and by-laws were presented for consideration by the Steering Committee and were unanimously approved. Committees were appointed for the following functions: membership, arrangements, financial, armed forces, civilian components, liaison and publicity.

The June 15th meeting followed a dinner at the Camp Gordon officers' club. President Fleming opened the meeting by introducing the various guests present. Major Norman J. Kinley was elected secretary-treasurer to succeed Major Nell Farnham who had been transferred to Germany. Col. H. F. Osborne, chairman of the liaison committee, reported that steps were being taken to interest members of the various civilian components of the armed forces, as well as Oliver General Hospital and Augusta Arsenal personnel, in the local chapter. Major D. C. Benjamin, chairman of the arrangements committee, gave an account of plans for speakers and demonstrations at future meetings.

The speaker of the evening was Mr. E. Wasson Hornsby of Atlanta, general commercial manager of the Southern Bell Telephone & Telegraph Co. Mr. Wasson chose the theme "Democracy" for his remarks and made an excellent analysis of the strength and weaknesses of our form of government, and the duties and responsibilities of United States citizens. His address was timely, forceful, and thought provoking — and was well received.

Baltimore—F. E. Moran, Pres.

The Point Breeze plant of the Western Electric Company was host to the Baltimore chapter for its annual dinner meeting on June 8th. One hundred and sixty-five members and guests were present. The guest of honor was Mr. Fred R. Lack, president of AFCA and vice president of Western Electric. In his address, Mr. Lack explained the vital importance of communications in modern warfare, the part that wire circuits played in World War II as compared with radio, and emphasized the purposes of AFCA. He praised the chapter and its officers for the splendid attendance at the meeting.

Chapter president Moran presided. The chairman of the nominating committee, Mr. Walter Evans, one of AFCA's national directors, read the nominees for chapter offices. The result of the vote was as follows: Mr. F. E. Moran was re-elected president for a second term; Mr. E. K. Jett, Baltimore Sunpapers and former FCC commissioner, was elected Vice-President; Lt. Col. Henry W. Williams, Chesapeake & Potomac Telephone Co., was elected secretary; and Lt. Col. H. L. Stecher, USA, was elected treasurer.

Brig. Gen. S. H. Sherrill, national executive director, spoke briefly, complimenting the chapter on its progress and activities during the past year and stressed the need for a vigorous recruiting campaign for more members.

Mr. A. B. Goetz, acting plant manager of the Point Breeze plant, welcomed the guests and described the operations of the Western Electric Company in its several plants in the U. S. A thoroughly interesting tour of the plant followed the meeting.

Meeting of Atlanta chapter. Air Force Col. George W. Goddard's demonstration of tri-dimensional photography was the feature of the evening. The projector is shown in this photo. Maj. Gen. Francis T. Anckenbrandt spoke on Air Force communications, of which he is the director.

Chicago—O. Read, Pres.

Action was taken at the reorganization meeting at the Hotel Stevens on May 20th which should return this chapter to an active status comparable to New York and the other large city chapters.

Rear Admiral Earl E. Stone, Chief of Naval Communications and Vice-President of AFCA, delivered an interesting address on the Navy's role and the importance of the electronics industry to the services. He said, "Industry has contributed much in the last fifty years—but, in the future, even more must be accomplished. Some of the specifications for research and development you see today may well appear to be impossible of accomplishment. However, the history of the communications-electronics industry does not record any major project failures. We are depending on you to a great extent to assist us to devise and produce military communications and electronics material to be available in time of emergency, and to train some of the electronics and communication personnel required by the military for emergencies."

AFCA President Fred R. Lack followed with a brief talk on the critical world situation and pointed out the objectives of the association and the need for its expansion and increased influence for military preparedness in the electronics and photography fields. Brig. Gen. S. H. Sherrill, National Executive Director, then outlined procedures followed by other

chapters that have been leaders in association activities and discussed AFCA accomplishments during its three years of existence.

Chapter officers were elected as follows: president — Oliver Read of Radio News; vice-presidents—J. H. Kellogg of Kellogg Switchboard & Supply Co.; R. T. Brengle for radio parts manufacturers; Dwight Brown of Illinois Bell Telephone Co.; John Howland, Zenith Radio; secretary-treasurer—Col. Raymond K. Fried.

On June 22nd, Chicago Chapter members turned out en masse for a highly informative visit and tour of Chicago's new long distance center. This new installation, developed by Illinois Bell Telephone engineers, is aptly called, "an electrical brain" and "mechanical wizard." The new toll dialing equipment serves Chicago long distance operators by sending calls direct to dial telephones in some 300 communities throughout the nation. As part of the demonstration, members witnessed the routing via coax of a call from Chicago to Philadelphia to New York and back to Chicago, all of which took only seven seconds for completion.

The principal speaker on the program, introduced by chapter president Oliver Read, was Brig. Gen. Frank C. Meade (Ret.), who spoke on "Electronics and Communications —First Line of Defenders."

Nearly 100 members attended dinner, and the crowd was further augmented at the meeting that followed.

The Chicago Chapter has gone on record that it is out to win the "Chapter of the Year" contest.

Rear Admiral Earl E. Stone, USN, speaking at Chicago's chapter meeting. To the left of Adm. Stone are Norman H. Saunders of Kellogg Switchboard & Supply Co., and AFCA Executive Director Brig. Gen. S. H. Sherrill. To the right of Adm. Stone are Oliver Read of Radio News and president of the Chicago chapter; Fred Lack, AFCA president and Western Electric V. P.; behind Mr. Lack is Paul V. Galvin of Motorola, Inc.; and far right is Wm. Halligan of Hallicrafters Co.

Cleveland—L. J. Shaffer, Pres.

The chapter's annual dinner meeting was held on May 5th at the Cleveland Engineering Society. Elected to the board of directors for terms expiring in 1951 were: T. R. Beatty of National Carbon Co.; H. C. Endress, Willard Storage Battery Co.; T. F. Peterson, American Steel & Wire Co.; and L. K. Wildberg, Radiart Corporation.

The annual report for 1948-49 was presented by President Shaffer, after which the members heard Mr. R. J. Kappanadze deliver a talk on "A Glimpse Behind the Iron Curtain."

The board of directors of the chapter met on June 27th. General plans were made for the coming year and officers were elected as follows: L. J. Shaffer of the Ohio Bell Telephone Co. was re-elected president for a second term; L. K. Wildberg was elected 1st vice-president; C. H. Endress of Willard Storage Battery Co. —2nd vice-president; T. F. Peterson —secretary; T. R. Beatty—treasurer. Members of the executive committee are: W. S. Sparling, Ohio Bell Telephone Co.; L. A. King, the Rola Co.; G. F. Prideaux, General Electric Co.; and H. E. Schafer, Radiart Corp.

Other chapters may be interested to know that the president and first vice-president of the Cleveland Chapter serve on the board of governors of the Cleveland Technical Societies Council. In addition, all Cleveland chapter members receive copies of the Council's weekly bulletin "Cleveland Engineering" and are thus kept abreast of happenings of interest.

Far East—G. I. Back, Pres.

The annual meeting of the Far East Chapter took place in Tokyo the end of June. Brig. Gen. George I. Back, chapter president, presided at the meeting. The principal speaker was Lt. Gen. George Stratemeyer, Commanding General, Far East Air Forces. In attendance were representatives of the Army, Navy, and Air Force and the communications industry in Japan. Details of the meeting will appear in the next issue.

Fort Monmouth—L. J. Tatom, Pres.

Officers of the Fort Monmouth chapter participated in the ceremony at which AFCA's first annual ROTC summer camp award was made at Fort Monmouth on July 28th. Mr. Fred R. Lack, AFCA President, and Brig. Gen. S. H. Sherrill, Executive Director, were also present. Details will appear in the next issue.

European—M. W. Newcomer, Pres.

The Hanau sub-chapter's membership drive brought in 265 new members during the month of June—all from the 7797th Signal Depot Group. This gives the European Chapter a 100% increase in membership and puts it currently in the lead for "Chapter of the Year."

Greater Detroit—R. J. McElroy, Pres.

The official petition for a "Greater Detroit Chapter" was received and approved at national headquarters on June 22nd. Thus what promises to be another vital chapter of the Association has been launched.

The organization meeting held in May was an unexpectedly enthusiastic and successful one. Mr. George T. Jeffers of Michigan Bell had made the arrangements. When more than 100 representatives of all communications and photographic interests appeared, it was obvious that keen interest in the Association and its objectives existed in that area. Representatives from Ford and General Motors, from Western Electric, Western Union, Michigan Bell Telephone Co., the three armed services, local colleges and photographic activities were among those who gathered in the telephone company's auditorium. A distinguished guest was Maj. Gen. S. E. Reinhart, retired, who commanded combat troops both in the

Pacific and European theaters and who had much to say on the good and the bad in World War II communications equipment.

Brig. Gen. S. H. Sherrill, Executive Director at national headquarters, explained the history and purposes of the association, its need as an instrument of military preparedness and its accomplishments. He pointed out the activities of chapters already organized and then outlined the procedure to follow in forming a chapter in Detroit. He also expressed his appreciation for the help of the Michigan Bell Telephone Co. which, he said, was typical of the leadership shown elsewhere by Bell System companies. A lively discussion followed which demonstrated the interest of the audience.

On June 9th, another meeting was held in the Bell Auditorium for the purpose of taking the final steps incident to the establishment of the chapter. The petition for charter was signed and the name "Greater Detroit" was selected for the chapter.

The following officers were elected to head the chapter: president—Robert J. McElroy of Michigan Bell; 1st vice-president—Charles E. Quick of Detroit Edison Co.; 2nd vice-president — George H. Goldstone, attorney; secretary—Robert Derr, New York Central R.R.; treasurer—James Grann, Jam Handy Organization; asst. treasurer—W. Clare Edwards, Michigan Bell.

Committee chairman were appointed as follows: Mr. Goldstone—activities; Mr. Quick—membership; Mr. Jeffers—constitution & by-laws.

It was decided to hold the next meeting of the chapter in September.

Kentucky—M. P. McQuown, Pres.
1949 Chapter of the Year

One hundred and twenty-five members and guests turned out for the May 24th meeting at which the "Chapter of the Year" award was presented by T. S. Gary, AFCA vice president in charge of chapters.

After an old fashioned Kentucky barbecue, chapter vice-president Harry Bradshaw, presiding in the absence of President McQuown, introduced Mr. Gary, who had come from Chicago for the ceremony. Mr. Gary gave a short talk on the chapter's success in winning the contest and then presented the "Chapter of the Year" scroll to Mr. Bradshaw.

The speaker of the evening was Lt. Col. Caesar F. Fiore of the Armored School at Fort Knox. Col. Fiore's subject was "New Signal Equipment" which he discussed with the aid of slides. Francis Greene, Lexington Signal Depot Fire Chief, concluded the program with a selection of movies.

The June meeting was held at the Officers' Club of the Lexington Signal Depot on June 10th. After supper, President McQuown gave a detailed report of the events at the AFCA convention which he had attended in Washington. This was followed by an exhibition of a selection of color slides made by Mr. John Krauss, a prominent Lexington amateur photographer. The program was concluded with a sports movie.

New York—G. P. Dixon, Pres.

The final meeting of the season for the New York Chapter, AFCA's oldest and largest, was held at the Seventh Regiment Armory on June 1st. The program had been arranged by Navy members of the chapter, and Capt. A. L. Wyckoff, USNR, started the proceedings by announcing that during the summer and fall the chapter would go "all out" to recruit new members from the Navy. Two intensely interesting Navy motion pictures followed—"The Fleet that Came to Stay" and "The Silent Service." Then several MARS certificates were presented by Maj. Gerald S. Morris, OIC, First Army MARS Activities, to hams who had recently qualified for membership in the Military Amateur Radio System. The first certificate was presented to Col. David Talley, veteran amateur radio operator who has done so much for ham activities in the military forces. Mr. George Bailey, President of ARRL, Executive Secretary of IRE and a Director of AFCA's New York Chapter, made some timely remarks before the presentations.

After dinner, President Dixon called on the following for informal remarks: Maj. Gen. H. C. Ingles, a director of the chapter and former Chief Signal Officer, now president of RCA Communications; former New York chapter presidents C. O. Bickelhaupt of AT&T and A. W. Marriner of IT&T; Capt. Roy Graham, USN, Communications Officer for the Navy's Eastern Sea Frontier; Col. Robert R. Yeager, Communications Officer for the C. G. Air Defense Command; Warren L. Jacobus, Spanish-American War Signal Corps veteran and an honorary member of AFCA; and Col. Grant Williams, former First Army Signal Officer, now with IT&T in Egypt. Brig. Gen. S. H. Sherrill, National Executive Director, who came up from Washington for the meeting, complimented the chapter on being runner-up in the "Chapter of the Year" contest and on its superior leadership.

A complete roster of the New York chapter, including group members, was prepared by the chapter and forwarded to all its members on July 1st.

Pittsburgh—F. E. Leib, Pres.

With its annual dinner-meeting on June 7th, the Pittsburgh Chapter closed a most active year. After President Leib reviewed the accomplishments for the year, a demonstration of modern television models was presented by Hamburg Brothers, local distributors for RCA.

There were two featured speakers. The first was Mr. W. J. McIlvane, executive vice president of Copperweld Steel Co. and a life member of AFCA, who gave an inspiring talk on the need for cooperation between industry and the armed services. The other speaker was Mr. Leon Collier, chief engineer of the industrial mobilization division of the U. S. Signal Corps, who came from Philadelphia for the meeting. He used a series of interesting slides and data to show the magnitude of the problem and the different things that are being accomplished. The program closed with two movie shorts supplied by the Army and Navy.

Sacramento—M. G. Mauer, Pres.

The chapter joined with the Sacramento Sections of the Institute of Electrical Engineers and the Amateur Radio Club in sponsoring a technical meeting on April 18th at the Sierra School Auditorium, Sacramento. The featured speaker was Dr. Cledo Brunetti of Stanford University who delivered a lecture on "Printed Circuits and Miniature Electronics." Dr. Brunetti was well qualified to present this subject. In 1941, he was cited "America's Outstanding Young Electrical Engineer;" in 1945 he received the U. S. Naval Ordnance Development Award and the War Department Certificate for Outstanding Service; and in 1947 he was awarded the "Industrial Oscar" for the contribution printed electric circuits have made to industry.

The June meeting was held at the Sacramento Signal Depot on the 9th.

CHAPTER NEWS

Mr. Walter C. Smith, Pacific District engineering consultant for the General Electric Company of San Francisco, gave a very interesting talk on recent engineering developments in the electrical industry. Mr. Smith had acquired first hand knowledge of his subject while on a recent tour of research laboratories. He dealt particularly with the development of new insulating materials, magnetic alloys, plastics and electro-coated materials. In the lighting field, he outlined the application of infra-red lamps, "black-light," the germicidal lamp and the high pressure mercury-quartz lamp for television studios. He also reviewed the more recent progress made in the field of electronics, including the photo-electric cell, television, radar, x-ray and the electron microscope.

The group was then taken on a jeep tour of the depot. Many favorable comments were received on the efficient storage and maintenance methods used in the handling of Signal Corps stock. The tour was followed by a dinner at the officers' club.

Officers elected for the 1950 fiscal year are: president—M. G. Mauer, Pacific Telephone & Telegraph Co.; 1st vice-president—G. H. Brereton, Chief, State of California Div. of Criminal Ident. & Invest.; vice-presidents: H. H. Crow, Kyle Co.; W. E. Doyal, science dept., McClatchy Senior High School; H. M. Skidmore, Public Info. Officer, Sacramento Signal Depot; executive secretary-treasurer—C. A. House management analyst, Sacramento Signal Depot.

St. Louis—C. P. Bobe, Pres.

Chapter members met on April 25th at the Mark Twain Hotel. After dinner Mr. Harry Walgreen of the Weather Bureau spoke on the art of forecasting the weather and gave the history of the Weather Bureau.

The May meeting was in the form of a picnic outing held at Heman Park, St. Louis.

Seattle—M. F. Kerr, Pres

A tour of the Lake Union Naval Armory was the highlight of the June 14th meeting of the Seattle Chapter. The group met at the American Legion Hall for dinner. President Kerr opened the meeting by introducing several distinguished guests. The guest speaker was Lieutenant G. Sanner, USNR, whose subject covered the Naval Reserve communications net and all volunteer and organized reserve units, including plans, facilities and drills.

The tour, which was arranged by Capt. C. C. Phleger, USNR, consisted of an inspection of the Submarine *Tupper*, Destroyer Escort *Rombach*, including fixed communications installations and other facilities of the Naval Armory.

The chapter has furnished its members with a directory listing those members who have supplied the chapter with information of value. The directory is divided into three sections: technical service listings, facilities for electronic construction or development, and supplier of electronic and allied components.

Southern California—H. W. Hitchcock, Pres.

The June 9th meeting took place at the Hollywood American Legion. Mr. Eric Pridonoff, former officer of the State Department with duty in Belgrade during the war, discussed the growth of communism, its current status, and how it might affect the future of the United States. His talk proved of such vital interest to the audience that it generated a two-hour discussion period at its close.

Washington—F. H. Engel, Pres.

A new slate of officers for the Washington Chapter has been elected as follows: President—F. H. Engel of RCA. Vice-presidents to represent the military and civilian membership of the chapter are: Army—Brig. Gen. Wesley T. Guest, Chief, ACS Div., OCSigO; Air Force—Maj. Gen. F. L. Ankenbrandt, Director of Air Force Communications; Navy— Col. A. F. Binney, USMC Dir., Electronics Div., Naval Bureau of Aeronautics; Civilian—Roland C. Davies, Editor, Telecommunications Report. Secretary-treasurer—Col. E. C. Cover of the Chesapeake & Potomac Telephone Co. (re-elected for a second term).

Plans are now being made for a membership drive and increased chapter activities in the fall.

Chapter of the Year Contest

The leaders for the first two months of the current contest are:

European
Chicago
Cleveland
Augusta-Camp Gordon
Baltimore

JAMES FORRESTAL

Seldom has fuller praise for an individual been heard from all sources—from Executive and Legislative parts of the government, newspaper and radio commentators and editorial writers —as that which followed the announcement of the shocking tragedy of James Forrestal's death.

These tributes were gratifying to all Americans who admired this man for his devotion to duty at the risk of his health for nine years of his wartime and post war service. He was the first Secretary of Defense and it seems quite likely that history may sometime consider him the greatest. His greatness was demonstrated when he saw the mistakes in the National Security Act of 1947. He broadened his vision through the years of his service. One of his greatest accomplishments may well be his masterful planning to secure for the higher level military officers a substantial increase in compensation and to overhaul completely for the first time in over 40 years the military pay procedures. This action may well save to the armed forces brilliant leaders who otherwise would have abandoned their service careers.

Dr. Karl Compton, former president of the Massachusetts Institute of Technology and now chairman of the Research and Development Board, expressed the feeling of all who admire James Forrestal as a great and unselfish public servant when he said: "Those who were in close contact with Secretary Forrestal appreciate as no others his great contribution. His ability, judgment, fairness and tremendous devotion to the job which he carried to the point of complete personal exhaustion deserve the unbounded gratitude of every loyal American." In Secretary Forrestal's death our country has lost one of its greatest patriots and one of the most devoted public servants our nation has ever known.

NEWS—SERVICES and INDUSTRY

General

Civil Defense Planning

Responsibility for the nation's civil defense planning has been laid on the shoulders of the National Security Resources Board in line with a directive issued in March by President Truman. Various phases of the planning, however, will be charged to a number of government agencies, with the NSRB handling overall coordination, NSRB Acting Chairman John R. Steelman said.

It was felt by observers that the major recommendations for civil defense contained in the report of the Office of Civil Defense Planning, headed by Northwestern Bell Telephone Co., President Russell J.Hopley, will be retained in the new structure. The Steelman order, however, rules out the OCDP proposal than an Office of Civil Defense be set up in the National Military Establishment. Some observers felt that the Hopley plan for a small office in the NME, with most of the work to be done locally, would have meant a smaller expenditure of government funds and personnel rather than having the work split up among various agencies.

Under the Steelman order, civil defense planning "against armed attack" was assigned to the NME. Other government departments brought into the picture would include the Federal Works Agency, for disaster relief, Federal Security Agency, Atomic Energy Commission, and the Departments of Agriculture, Commerce, Interior, Treasury and Justice.

Mr. Steelman said that President Truman was seeking "planning and preparation for civil defense in the event of war, rather than the peacetime operation of a full-scale civil defense program."

Mr. Steelman has temporarily designated William A. Gill, Director of Mobilization Procedures and Organization for the NSRB, to coordinate the planning activities.

Selling to the Services

Numerous inquiries are being received concerning this subject. Many are routine and time would be saved if they were sent direct, as follows:

Procurement Agencies, National Military Establishment for communication, electronics and photographic equipment.

ARMY (Signal Corps)

S.C. Procurement Agency, 2800 South 20th St., Philadelphia 45, Pennsylvania.

Chief, Laboratory Office, Contracts Division, S. C. Procurement Agency, Fort Monmouth, New Jersey.

AIR FORCE (also purchases *all* photographic equipment)

Procurement Division, Air Materiel Command, Wright Field, Dayton, Ohio.

NAVY

Bureau of Ships (all Navy radio and electronics purchases), Office of Homer Bowie, Code 1710A, Rm. 1024, Navy Bldg., Washington, D. C.

Chief Naval Research, Contracts Section, Code 262, Navy Department, Washington 25, D. C.

Naval Research Laboratory, Supply Officer, Code 302A, Washington, 20, D. C.

Detailed information may be had by purchasing "Selling to the Navy" from our book department. It explains the Navy's procurement organization and lists its major purchasing offices in the field. One section of the booklet is entitled "Getting a Navy Contract." This section explains how to get on the mailing list to receive invitations to bid or requests for quotations and discusses such questions as competitive bidding, negotiation, specifications, inspection, qualified products list, insurance, shipments and payment. The booklet also includes sections dealing with procurement coordination between the three services and procurement planning for industrial mobilization. It has additional value as a reference book since it includes appendices which list the Navy purchasing activities and the addresses of the general inspection offices of the Navy's material inspection service. The Signal Corps recently advised us that they are considering publishing a similar book for the Signal Corps, or helping to prepare one for the Army or perhaps for the National Military Establishment.

RMA Silver Anniversary

During its twenty-five years the Radio Manufacturers Association has grown into a powerful force for the improvement of the radio industry and for assistance through its studies and advice to the radio interests of the armed services. AFCA's past president, Gen. David Sarnoff, speaking at the association's annual meeting in March, called on business to make personal sacrifices. RMA's first president, Colonel H. H. Frost, is one who has led the way in such sacrifices since 1917, when he served in World War I. Through the years he devoted much of his personal and business time to preparing himself to serve again, if his country called, as it did in W W II. His service as a combat officer, C/S of the 13th Armored Division in the European Theater, climaxed his military career with resultant decorations including the Purple Heart and the French Legion of Honor. Colonel Frost was the principal speaker at the RMA's Silver Anniversary Banquet at Hotel Stevens, Chicago, May 19th.

At a meeting of the Chicago chapter of AFCA at the Stevens the following evening, General S. H. Sherrill, National Executive Director, paid tribute to RMA and its current officers and leaders for their demonstrated interest in national defense and their contributions toward better military communications, the chief objective of AFCA.

New NME Electronics Dir.

The National Military Establishment has appointed Edwin A. Speakman as executive director of its Committee on Electronics Research and Development Board.

Mr Speakman has been associated with the Naval Research Laboratory since 1940 and has been branch head of the Radio Countermeasures Section since 1945. He succeeds Norman L. Winter, who was director of the Committee on Electronics from its formation in 1946 until March 1, 1949. In the interim, Colonel Howard W. Serig, Air Force Secretary of the Committee, has been acting executive director.

While attending Haverford College, Haverford, Pennsylvania, from which he was graduated in 1931 with a B.S. degree in physics, Mr. Speakman invented the first automatic photoelectric timing system for use in timing sports events. He served as an instructor in radio at Haverford College for three years following completion of his course there. From 1934 to 1939, he was a radio engineer with the Philco Corporation in Detroit.

In September 1947 Mr. Speakman received the Meritorious Civilian Service Award from the Navy for his work in radar. He is a member of

RCA scientists find way to combat noises in rooms where normal sound control methods are impractical.

These "Cones of Silence" **smother sound!**

You think of RCA Laboratories—in part—as a place where scientists work with *sound,* for radio, television, phonographs. This is true, but they are also deeply concerned with *silence.*

One example is a recent RCA development, a way of killing clatter in places where conventional sound-conditioning—with walls or ceilings of absorbent materials—would get in your way. Overhead pipes, ducts or other fixtures might prevent the installation of a sound-absorbent ceiling—and you wouldn't want to blanket a skylight.

RCA's invention solves the problem in this way: Cones of sound-absorbent substances are clamped together base-to-base . . . then hung in rows where not in the way. Light, inexpensive, easy to install, these "Cones of Silence" convert sound waves into heat energy, and will absorb from 60% to 75% of the clatter in a noisy room.

How you benefit:

Development of this functional sound absorber indicates the type of progressive research conducted at RCA Laboratories. Such leadership in science and engineering adds *value beyond price* to any product or service of RCA and RCA Victor.

The newest developments in radio, television, and electronics can be seen in action at RCA Exhibition Hall, 36 West 49th St., N. Y. Admission is free. Radio Corporation of America, Radio City, N. Y. 20.

RADIO CORPORATION of AMERICA

World Leader in Radio—First in Television

the American Physical Society, the Institute of Radio Engineers, the U. S. Naval Institute, and the Board of Civil Service Examiners for the Potomac River Naval Command.

Frequency-Band Designations

The following proposed Standard Frequency-Band Designations are presented by the Standards Committee of the IRE in order that comments on them may be received from all interested parties prior to final standardization. Comments should be mailed to the Chairman of the Standards Committee, Professor J. G. Brainerd, at Institute Headquarters, 1 East 79th St., New York 21, N. Y. Final standardization will be considered in August, 1949.

At various times during the past several years, there have been proposals to establish standard frequency-band designations. In 1945, the Standards Committee of the Institute adopted a decade system which was described in the August 1945 issue of the *Proceedings of the I.R.E.* In this system the band number indicated the exponent of the number ten corresponding to the midfrequency, e.g., band 6 centered on 10^6 cycles with limits of 300 kc and 3 Mc.

In the May 1947 issue of *Electrical Engineering* an alternative system was described, proposed by H. M. Turner, in which the band number was the exponent of ten corresponding to the lower frequency limit, e.g., band 1 covered a range of 10-100 cps (one exception was that band 0 covered 0-10 cps, rather than 1-10 cps).

During the above period several other methods of designating portions of the frequency spectrum have been evolved, using letters or names, such as uhf band, etc., with the result that at the present time there exists no method of band designation accepted by the majority of engineers. In order to resolve this confusion, a re-study of the problem was authorized by the Standards Committee at its meeting on September 9, 1948.

The objective of a system of band designations is:

To provide a form of shorthand terminology which gives a general idea of what part of the frequency spectrum is referred to without stating exact frequencies, for use in papers, articles, oral presentations, text books, instruction books, etc.

The desirable characteristics of such a system are:

a. That it instantly convey to the listener or reader an idea of the frequencies pertinent to the subject at hand with minimum effort on the listener's part (no memory feat should be involved).
b. That it be readily extensible to bands either up or down in the frequency spectrum.

It is not anticipated that such a system shall rule out use of other designations, such as audible region, microwave region, infrared region, etc. There will also undoubtedly continue to be need for more specific band designations within one or more of these standard bands. It is felt, however, that the following system should contribute materially to uniformity in our written and spoken references.

The proposed Standard Band Numbers and corresponding spectrum limits are given in the following table:

Band No.	*Frequency Range*	*Approximate Equivalent Wavelength*
0	10^0-10^1 C (1-10 cycles)	3×10^8 -3×10^7m (300-30 megameters)
1	10^1-10^2 C (10-100 cycles)	3×10^7 -3×10^6m (30-3 megameters)
5	10^5-10^6 C (100-1000 KC)	3000-300m (3000-300 meters)
6	10^6-10^7 C (1-10MC)	300-30m (300-30 meters)
15	10^{15}-10^{16} C (1-10 KMMC)	3×10^{-7} -3×10^{-8}m (300-30 millimicrons)

NOTES:
1. The lower frequency is inclusive, upper exclusive. Thus 10 cycles belongs in Band 1.
2. The system may be extended below 1 cycle by the use of negative band numbers. Thus Band No. -1 covers 0.1-1 cycles.
3. Used as an adjective, the word "Band" shall precede the number; thus, "Band 3 . . ."

The following table gives proposed standard units for specific frequency designations:

Unit	*Abbreviations*
Cycle	C
Kilocycle	KC
Megacycle	MC
Kilomegacycle	KMC
Megamegacycle	MMC

(Note—The "per second" is implied in the above frequencies.)

Megameter	Mm
Kilometer	Km
Meter	m
Centimeter	cm
Millimeter	mm
Micron	μ
Millimicron	mu
Micromicron	$\mu\mu$

Sarnoff Foresees Vast Opportunities in Electronics

Radio, television and electronics provide a vast field of opportunity for young Americans alert to clues that lead to discoveries and inventions, Brig. Gen. David Sarnoff, chairman of the Board of the Radio Corporation of Americ[illegible] and past president of AFCA, told members of the graduating class of RCA Institutes at commencement exercises in a studio of the National Broadcasting Company at Radio City.

Graduates of RCA Institutes, which is the oldest radio technical training center in the United States, numbered 163 at this year's commencement. They included young men having completed courses in radio servicing, operating and broadcasting, and advanced technology covering maintenance, operation and development of circuits and equipment in both radio and television. A welcoming address was given by Maj. Gen. George L. Van Deusen.

Design Simplification Asked

The Munitions Board has asked the armed forces to give special attention to simplification in the design of military material as an aid to production.

In a memorandum to the three departments, the Board said members of industry have pointed out that production capacity could be increased many times if present complicated designs could be simplified.

In asking that efforts be made to simplify designs, the Board stated that the degree to which such simplification should be undertaken could be decided only in the departments, as adequacy to meet military needs must be given first consideration in design selection.

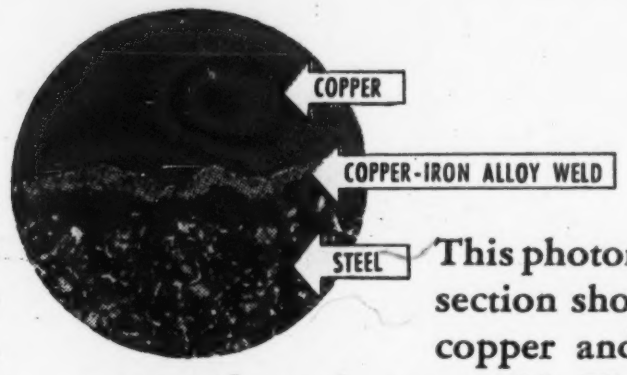
The Board's memorandum further stated: "Increasing the capacity of industry for the production of the necessary equipment for the services is a matter second only in importance to assuring that the equipment meets the combat needs of the services. The effect of design on the productibility of an item is such that simplification of design may be necessary in order that it may be produced in quantity in time to meet strategic requirements."

"Angels" and Radar

Mysterious radar reflections which have baffled the world's electronics experts both during and since the war have been explained by scientists of Bell Telephone Laboratories. The cause: flying insects.

Nicknamed "angels," the heretofore unexplained "blips" have shown up confusingly on many radar scopes

proved -a million times!



This photomicrograph of the weld section shows how the crystals of copper and steel form a permanent and continuous weld. The perfect interlocking of these two metals, accomplished only by Molten-Welding, provides rugged strength, high conductivity, rust-resistance and long life.

According to the aerodynamic theories of a few years ago, it was impossible for the bumble bee to fly. Its body was too heavy for its wings. Despite this handicap, bumble bees by the millions refused to be grounded.

Before 1915, copper and steel had never been successfully integrated and doubters said that a practical method would never be found. The different melting points and the varying expansion rates of these two metals had presented too much of a problem. Then Copperweld Steel Company developed the Molten-Welding Process, and presented industry with the first successful copper-covered steel wire. Today, the millions of miles of Copperweld Wire in service have proved that Copperweld provides the highest standards of efficiency at lowest annual cost.

In the Molten-Welding Process, molten copper is poured around a heated alloy steel billet under carefully controlled temperatures and casting conditions.

Tensile strengths up to 180,000 pounds per square inch are attained with the special alloy steel used in Copperweld Wires. And these strengths are permanent because the steel is always protected by a heavy copper covering of uniform thickness.

When your specifications or purchase orders call for Copperweld, make certain that you get Copperweld quality by actually seeing the name "Copperweld" on the product itself or on the tag accompanying every coil and reel.

COPPERWELD STEEL COMPANY • Glassport, Pa.

Sales Offices In Principal Cities

Copperweld TRADE MARK

PRODUCTS

• POWER CONDUCTORS • GUY & MESSENGER STRAND • OVERHEAD GROUND WIRE • GROUND RODS • CLAMPS • COUNTERPOISE WIRE • TELEPHONE LINE WIRE • TELEPHONE DROP WIRE • WEATHERPROOF WIRE • SIGNAL LINE WIRE • SIGNAL BONDS • INSULATOR TIES • NAILS & STAPLES • FENCE & BARBED WIRE

as sharp echoes of short duration, observable most frequently below heights of 3,000 feet.

The explanation that the "angels" are caused by flying insects is contained in a communication to the April issue of the *Proceedings of the Radio Engineers* from A. B. Crawford of Radio Research. The strange reflections were discovered during the war by M. W. Baldwin, Jr., of Television Research.

Since that time, they have been the subject of considerable research. A number of observers have suggested they were due to atmospheric changes which result in turbulent motion in the lower atmosphere.

The tests and observations reported were sponsored jointly by the Laboratories and the Naval Electronics Laboratory and were conducted at Gila Bend, Arizona. Working on the problem, besides Mr. Crawford, were L. R. Lowry and S. E. Reed of Radio Research, and J. B. Smyth and L. J. Anderson, of the Naval Electronics Laboratory.

Mr. Crawford's investigation of "angels" was undertaken as part of fundamental studies and microwaves which are being increasingly used to carry telephone messages and television programs over the Nation's communications networks. Most radar equipment operates in the microwave region.

In his communication, Mr. Crawford wrote that he was led to the conclusion that the reflections were caused by insects "when all attempts to synthesize 'angels' by artificially producing boundaries of temperature, humidity or turbulence failed completely and when visual observations of insects coincided strikingly with the radar observations."

In their attempts to synthesize the strange patterns on the radar scopes, the scientists exploded a small charge of nitro-starch in the air, 500 feet above their radar antennas. They flew a plane low over the radar and looked for reflections from the exhaust gases. They built bonfires, upwind, so that the hot combustion gases and steam clouds formed by pouring water on heated rocks billowed into the beam. In all these experiments, the phenomenon was never observable.

Later, working at night, they threw out a strong searchlight beam, and stationed observers at different levels of a 200-foot tower. While the observers counted insects, the radar operators counted the appearance of "angels" on their scopes. For example, in one fifteen-minute period, twenty were counted, fifteen coinciding with the sighting of an insect.

Mr. Crawford points out that insects fit most of the descriptions which have been applied to the mysterious reflections on radar scopes. They are small, they move at a speed comparable to wind velocity, sometimes with and sometimes against the wind, they are present both day and night, and there are more of them in warm weather than in cold.

Bell Laboratories Record.

Hawaii Station for Pacific Area

A new experimental radio station on the island of Maui, Territory of Hawaii, is now broadcasting continuous time and frequency standards. Station WWVH, operated by the National Bureau of Standards, will provide the Pacific area with four useful technical services; standard radio frequencies, time announcements, standard time intervals, and standard musical pitch. Omni-directional antennas radiate approximately 400 watts of power on each carrier frequency.

The broadcast services of WWVH are essentially the same as those of station WWV, operated by the Bureau at Beltsville, Md., which transmits on frequencies of 2.5, 5, 10, 15, 20, 25, 30, 35 Mc.

It is expected that station WWVH may be usefully received at many locations not served by station WWV, and that simultaneous reception of WWV and WWVH in some localities will not interfere with ordinary use of the standard frequencies and time signals.

During the continuous operation of WWVH on 5, 10, and 15 megacycles, accurate time signals in the form of audiofrequency pulses are transmitted on each carrier frequency at intervals of precisely one second; on the 59th second of each minute the pulse is omitted. Standard musical pitch is provided by modulating each carrier at a standard audio-frequency of 440 cycles per second (A above middle C). The audio frequency, starting precisely at the beginning of each hour, is broadcast for four minutes and interrupted for one minute; this sequence is repeated throughout the hour. Greenwich Mean Time is given in International Morse Code every five minutes; time announcements refer to the time when the audio tone returns. The station call letters WWVH follow each time announcement.

The radio and audio frequencies and time intervals of one minute or longer broadcast by WWVH are accurate to one part in fifty million or better. Time signals are precisely adjusted with U. S. Naval Observatory time so that they accurately mark the hours and shorter intervals. Seconds pulses from WWVH are synchronized to within 0.001 second with those sent out by WWV.

Journal Franklin Institute.

SIGNAL CORPS

Big EUCOM Signal Center

A vast EUCOM Signal Corps communication center for interzonal and international radio-telegraph, radio-telephone and radio-teletype circuits, linking U. S. Government agencies in EUCOM with every major center in Europe and in the United States, is being established at Edlingen, near Mannheim. The new communication center meets the demands of EUCOM for a powerful transmitter and receiver station, capable of handling heavy traffic without interference and disturbances. Circuits are available for radio-teletype to Washington, Berlin, Frankfurt, Athens, Trieste and Vienna. One of the circuits to Washington, using only one radio frequency, is capable of operating six radio-teletype channels simultaneously, each sending at a speed of 60 words per minute. This high-powered equipment is used for teletype conferences between Europe communication centers and Washington and is available to all U. S. Government agencies in EUCOM. In addition, it has a voice channel which may also be used for transmission of pictures, maps and other visual material to the U. S. The Signal Division, EUCOM, is responsible for the engineering and operation of the vast communication center.

Army-Navy Journal.

Silent Chamber

A "Silent Chamber" that produces absolute stillness — simulating the sound condition found in the very center of the desert—has been designed and constructed by Signal Corps engineers for the testing of delicate instruments.

Known scientifically as an anechoic (no echo) chamber, it was designed primarily to determine operational accuracies of microphones, head-sets, loud-speakers and other items requiring minute examination.

The chamber is needed to test the sensitivity of existing sound receiving and reproducing apparatus and the value of any improvements offered. An ordinary sound-proof room was not enough because any variation, such as the reflection of sound from walls, introduced a false reading on the indicators.

NEWS

Following extensive experiments it was found that fiberglass was the most sound-absorbent material available. Also that walls, floor and ceiling, made of wedges picked up sound waves and caused them to reflect in increasing depth. The combination of fiberglass in the form of wedges absorbed all sound energy, transforming it into heat, by the time it had been reflected to the small end. The wedges are bound together at the large end to an electrostatic shield forming a wall, roof and floor, that is grounded to remove any surplus electric energy.

The value of an accurate means of knowing how much noise is made by all kinds of machinery used by the Army and effective methods of eliminating this noise cannot be underestimated. For instance, the noise made by a hand generator operating a piece of equipment in the field would reveal the presence of the operator to the enemy, even if he could not be seen. He would be quickly eliminated and that piece of apparatus put out of action. However, this noise is carefully checked and measured in the silent chamber and from the result the engineers are able to reduce it enough to prevent detection. Instruments are received at the Signal Corps Engineering Laboratories for testing and correction from Army installations all over the country.

Code Is Honored

At a recent ceremony in the Office of the Belgian Military Attache, Major General James A. Code, Jr., USA (Retired) was presented with the Cross of Commander in the Order of the Crown of Belgium for distinguished service rendered to the Kingdom of Belgium while acting as senior United States Signal Officer in the European Theater of Operations during the critical months of January, February and March 1945.

General Code, a native of San Francisco, California, was graduated from West Point in 1917. His military career culminated as World War II Deputy Chief Signal Officer, United States Army, with the rank of Major General.

General Code is now serving as Chief Executive of the Gary Group of telecommunications interests in Chicago, Illinois.

Logistics Maneuver

More than 15,000 telephone calls are handled daily in the intense "play" of the command post exercise at Camp Lee, Virginia—largest in U. S. Army history.

Communications is only one of the logistical factors in the new type support organization tested during "Exercise Log Lee" May 23-29.

Setting up message centers for the "paper" maneuver necessitated the installation of 338 telephones operating from ten switchboards and the laying of more than 75,000 feet of wire and cable.

The networks of phone cable were laid between buildings used variously as headquarters, towns, and depots in the exercise.

Royal Signals Annual Meeting

Royal Signals, British counterpart of the U. S. Army's Signal Corps, held their annual dinner at Hyde Park Hotel, Knightsbridge, London, England, on May 30th.

165 officers, either of the active Army or who served with Royal Signals during the first or second world war, attended. The guest of honor was General Sir Bernard Paget who was commanding general of home forces in England during the greater part of World War II, and was responsible for the build-up and training of all the formations of the British Army which were sent out from England during the greater part of the war years.

Among the guests were Major Glen S. Waterman, Signal Corps, who is assigned to liaison duties with the School of Signals at Catterick and is in no small measure responsible for U. S. successes achieved in swimming and water polo competition there. Among the fourteen general officers was C. H. H. Vulliamy who last year, while Director of Signals, was the guest of the United States Army Signal Corps during an extensive tour of communication establishments in America. He is an honorary life member of AFCA.

West Point Graduates

AFCA extends best wishes for long and distinguished careers to the following USMA 1949 graduates who have chosen the Signal Corps as their branch of service.

D. B. Dickinson
P. C. Fleri
E. B. Howard
W. J. Kennedy
K. Lamar
M. D. Lampell
W. H. Lowrey
W. F. Luebbert
J. A. May
J. B. Mitchell
L. P. Monahan
G. A. Nigro
R. T. O'Brien
J. F. Sencay
J. H. Yepsen

CHANGES IN KEY PERSONNEL

Corderman and Hayes

Colonel W. Preston Corderman, formerly Director of Communications, Headquarters, Alaskan Command, has been appointed Chief of Staff of that Command. He will be succeeded as communications director by Colonel Harold G. Hayes, formerly Chief, Army Security Agency, now on duty in the Office of the Chief Signal Officer, Washington, D. C.

Colonel Corderman has had a brilliant career since his graduation from USMA in 1926. During World War II he served as a brigadier general and before the war he was assigned to the War Department General Staff in Washington, one of the very few Signal Corps officers to receive such an assignment. In June 1948 he graduated from the National War College.

General Wooley Retires

George F. Wooley, Jr., who has been head of the Depot Branch in the Office of the Chief Signal Officer since March 5, 1947, retired from the Army May 1st as a brigadier general.

During World War II General Wooley saw service in North Africa, Italy and Southern France. He was Signal Officer in Seventh Army Headquarters during the planning phase for the amphibious landing in Southern France and during the operation itself. For this work, he received the Legion of Merit. He also holds the Distinguished Service Medal, the Bronze Star Medal, and the French Croix de Guerre with Palm.

Appointed to the United States Military Academy from Nebraska in 1913, he graduated in 1917. He received a Master of Science degree in Communications Engineering from Yale University in 1930.

Hammond to General Staff

Colonel Elton F. Hammond, World War II Signal Officer for General Patton in the Third Army, has been assigned to Army Department General Staff in Washington. Formerly Chief of the Personnel and Training Branch of the Office of the Chief Signal Officer, he is now Executive Officer for the Logistics Division of the General Staff.

Reeder Moves Up

Major General W. O. Reeder, Signal Corps officer with distinguished service in the schools at Fort Monmouth, wartime Signal and later General Staff Officer in China-Burma-India, has been appointed Deputy Director of the Logistics Division of the Army Department General Staff. Previously he had been acting as one of two such deputies.

Signal Corps WW II History

The Signal Corps in World War II will occupy three to four volumes in the massive narrative program of the Historical Division, Special Staff, United States Army. Now being prepared, the history of the Signal Corps will be a continuous account of this service between 1939 and 1946.

The first volume opens with a sketch of the Signal Corps before 1939 and the last closes with demobilization, including such accomplishments as contact with the moon by radar in January, 1946, and the postwar reorganization of the military establishment. Dulany Terrett, who is directing the work, has chosen the chronological and panoramic method because it keeps the activities of the Signal Corps in the framework of the times in which they occurred and in association with the entire view which the major series will present.

More of the story lies in the period of the emergencies and the first year of war than is the case with combat volumes. More of it occurs in the Zone of Interior, also. The end result of the earlier continental efforts, however, was the later overseas action; and therefore the scope of the history includes both the preliminaries and the war itself, and will endeavor to paint a picture of Army communications throughout the world. The theater and combat narratives of the *U. S. Army in World War II* cannot treat this subject without departing from their own. Likewise, the complex and significant story of Signal Corps connections with the Army Air Forces and the Navy—the account, for instance, of radiosonde or of joint assault signal companies—must appear somewhere in the more than one hundred volumes which the Army, Navy and Air Force intend to publish, and the Signal Corps history provides the logical place. This is to say, then, that the work is a history of the Signal Corps in the whole millieu of the Second World War, and will presumably be of value to military, naval, air force and civilian readers in general as well as to those persons in the military and historical professions, industry and applied science who are specifically interested in it.

Dr. George Raynor Thompson is at work on the engineering and technical subjects of the history, Miss Ruth G. McKee on the many aspects of supply, and Miss Pauline M. Oakes on personnel, training and administration. Any of them will be glad to

hear, directly or through correspondence, from any member of the Armed Forces Communications Association who can contribute the personal knowledge of problems or occasions which gives immediacy to the account of them. Address all correspondence to the Chief, Historical Division, SSUSA, Washington 25, D. C., Attention: Dr. Dulany Terrett; or telephone Republic 6700, extension 75656.

AIR FORCE

AF Orlando Meeting

The progress which the Directorate of Communications and field communications officers of the Air Force have made in organizing, extending and modernizing the communications facilities and systems of this all-important arm of the nation's defense, was the highlight of the presentations made at the May 12-13 Conference of approximately 175 senior communications officers of all major Air Force units at the Orlando, Fla. Air Force Base under the leadership of Maj. Gen. Francis L. Ankenbrandt, Director of Communications, Headquarters, Air Force.

The conferences of the USAF communications officers have been semi-annual sessions since the fall of 1947, and all previous sessions have been held in Washington at the Pentagon. But largely due to the proposals for the arrangements by Col. C. S. Miller, the Directorate of Air Communications has made a tentative decision to alternate future conferences between Washington and a field installation in the United States.

On May 12, the top staff officers of the Directorate of Communications at the USAF Headquarters, with General Ankenbrandt inaugurating and directing the reports, described the progress of the past six months in the organization and expansion of communications activities. Col. J. B. Bestic, Chief of the Communications Systems Division, described the modernization and extension of the Air Force Command Communications Network as planned and effectuated by the Directorate, while Col. N. J. McGowan, Chief of the Directorate's Electronic Systems Division, presented a report on the progress in air navigational aids and aircraft warning systems.

The communications officers of the major Air Force commands, both domestic and overseas, presented May 13 a comprehensive report on their activities and in the progress in communications in their respective regions, and brought the 175 senior communications officers up to date on local conditions.

[*Editor's Note: An invitation has been sent to the Air Force to hold this conference next spring at the place and date of the AFCA national meeting.*]

Outstanding in this phase of the conference was the expositions of problems in the Berlin Airlift by Col. J. R. Guthrie, representing the USAF and the 1807th AACS Wing in Europe; the problems in the Far East by Col. V. H. Wagner, representing the Far East Air Forces; and a discussion of the difficulties of communications in Alaska, presented by Lt. Col. F. E. Herrelko of the Alaskan Air Command. (It was previously announced that the Continental Air Command's 531st Aircraft Control and Warning Group was moved to Anchorage. The 319th All Weather Squadron is being returned from the Caribbean Area to replace the 531st at Tacoma, Washington.)

Presentations on the Far Eastern and Alaskan situations were of special interest to the conference, it was understood. Another presentation of importance was that of the communications operations of the Third Air Division in England. All the conferees were in agreement that the presentations by the individual major commands contributed materially to mutual understanding of Air Force communications problems and questions.

An open forum discussion with General Ankenbrandt presiding, May 13, dealt with all phases of communications in the U. S. Air Force. In this discussion considerable progress was made in the solution of a number of important communications problems, notably supply and training.

"Operation Blackjack"

General Hoyt S. Vandenberg, Chief of Staff of the U. S. Air Force, announced a two-month air defense training exercise, "Operation Blackjack" beginning May 1st.

During the operation the Air Defense Command, primary defense organization of the Continental Air Command, will test equipment, develop and improve procedures, and train personnel in techniques relating to the defense of the United States from air attack.

The first part of the operation will be devoted primarily to the organization and improvement of the elaborate communications system necessary for an adequate air defense system. Later, bomber type aircraft will be used to fly planned routes for the purpose of training radar interceptor operators and interceptor fighter units.

Continental Air Command is commanded by Lieutenant General Ennis C. Whitehead. Air Defense Command is commanded by Major General Gordon P. Saville. Headquarters for both organizations are at Mitchel Air Force Base, Hempstead, L. I., N. Y.

AF Radar Unit Moves

The Air Force's 531st Aircraft Control and Warning Group, previously assigned to Continental Air Command, McChord AFB, Tacoma

Air Force Academy

It seems probable that legislation establishing an Air Force Academy will soon be introduced and passed by the Congress. The Spaatz plan to increase the capacity of West Point and Annapolis and divide their graduates equally between Army, Navy and Air Force would unquestionably better serve the interests of the Air Force since the magnificent traditions of the two service academies are among their greatest assets. But the physical plants at the two academies cannot be materially enlarged. Even now three cadets are assigned to rooms at West Point which were designed for only two occupants.

In its recommendation that a separate academy be established, the National Military Establishment report stated its "conclusion that a substantial proportion of the officers of the National Military Establishment must be obtained from academies for they set a pattern for reaching and maintaining the highest professional standards." These standards are of greatest importance in combat, and records of the two academies recently released show what these standards mean to the academy graduate—of all the Naval Academy graduates who served in World War II, 6.3 per cent were killed in combat while 5½ per cent of the 8,860 West Point grads were killed in action. This latter figure does not include the considerable number lost on Japanese prison ships and otherwise not technically in combat. The classes graduating early in the war of course suffered the heaviest—some of them losing about 20 per cent killed. These figures compare with 2.1, the per cent of enlisted men killed; 2.2, the per cent of total Army strength killed; and 3.3, the per cent of total Army male officers killed. The National Military Establishment report further states that while less than 30 per cent of the career officers in all the services are Service Academy gaduates, the Air Force is particularly handicapped with only 10 per cent Service Academy graduates. At present West Point allocates 40 per cent of its graduates each year to the Air Force while Annapolis allocates but 7 per cent.

RESISTORS AS ACCURATE AS YOUR SLIDE RULE

In instrument development or government electronics, when you need positive stability or close tolerance in resistors, specify IRC. Within the widest range of resistance products in the industry .there are many types specially IRC engineered to meet your requirements.

Here are a few IRC resistor types noted for their stability or accuracy. PRECISTORS are deposited carbon precision units offering high stability over long periods of time. Low cost, small and lightweight, they are available in 1%, 2% and 5% tolerances. Excellent high frequency characteristics, and low noise levels are inherent.

For closer tolerances, IRC provides Precision Wire Wound Resistors with 1% accuracy standard, but tolerances to 1/10% are available.

Where low cost is important, IRC Matched Pairs (2 resistors matched in series or parallel to as close as 1% initial accuracy) offer a popular solution. For low range requirements, investigate Type BW Insulated Wire Wounds. Small and inexpensive, at ½, 1 and 2 watts, they compare to JAN-R 184 types RU3, RU4 and RU6.

IRC Sealed Precision Voltmeter Multipliers meet government specifications. Stable wire wound element is encased in watertight, glazed ceramic tube to provide absolute protection against the most severe humidity conditions.

When you are under pressure for fast service on small orders of *standard* resistors, call your local IRC Distributor. Through IRC's Industrial Service Plan, he can give you 'round-the-corner delivery right from his local stocks. We'll be glad to send you his name and address. International Resistance Co., 401 N. Broad St., Philadelphia, Penna. *In Canada:* International Resistance Co., Ltd., Toronto, Licensee.

Wherever the Circuit Says —WW—

Power Resistors • Voltmeter Multipliers
Insulated Composition Resistors
Low Wattage Wire Wounds • Controls
Rheostats • Voltage Dividers
Precisions • Deposited Carbon Precistors
HF and High Voltage Resistors
Insulated Chokes

IRC

INTERNATIONAL RESISTANCE COMPANY
401 N. BROAD STREET, PHILADELPHIA 8, PA.

J. P. ARNDT & CO., ADV. AGENCY

INTERNATIONAL RESISTANCE CO.
413 N. BROAD STREET, PHILADELPHIA 8, PA.

I would like additional information on the items checked below.

- ☐ Deposited Carbon PRECISTORS
- ☐ IRC Matched Pair Resistors
- ☐ Type BW Resistors
- ☐ Precision Wire Wounds
- ☐ Voltmeter Multipliers
- ☐ Name of Local IRC Distributor

*Name*_____

*Title*_____

*Company*_____

*Address*_____

Wash., left in May and June for permanent assignment to Alaskan Air Command. The Group is now stationed at Elmendorf AFB, Anchorage.

NAVY

Radio Point Loma Retired

After nearly a half-century of operation, the Navy's historic radio station at Point Loma was decommissioned June 24th during ceremonies which also included the breaking of the earth for a new building at the Navy Electronics Laboratory. Located on the Laboratory's grounds, the building formerly housing the radio station will be converted to a modern sound-recording laboratory for research purposes.

The history of Radio Point Loma is a colorful one. Not only did the station contribute to the evolution of modern radio equipment and procedures, but through its transmitters flashed many of the messages which shaped world history since the turn of the century. The San Francisco earthquake, the sinking of the Titanic, the assination at Sarajevo, the disastrous San Diego flood of 1916 and the attack on Pearl Harbor were but a few of the important happenings which Radio Point Loma reported to civilian and military listeners in this part of the world.

Honored guest at the ceremonies was Rear Admiral Wilder D. Baker, Commandant Eleventh Navel District, who turned the first spade of earth at the site of the new laboratory building.

Also speaking were Captain O. C. Ray, USN, Eleventh Naval District Communication Officer, Captain R. Bennett II, USN, Director of the Navy Electronics Laboratory and Mr. R. B. Stuart. Mr. Stuart, formerly a Navy chief electrician, made the original installation at Radio Point Loma in 1906.

The ground breaking marked the start of construction of new facilities for the Navy electronics laboratory on the grounds of the decommissioned Point Loma Radio Station, a valuable fleet service and a landmark to San Diegans since 1907. The new buildings will permit the laboratory to continue its mission, assigned in 1939, of serving the fleet in the design, procurement, development, and testing of electronic equipment.

Increasing demands for its services during the war years forced expansion of the Navy electronics laboratory from a few small buildings at the southern edge of the radio station grounds into, first, additional temporary structures in the same area, then into barracks-type buildings constructed as troop housing nearby on the Fort Rosecrans military reservation. While useful in the war emergency, these temporary structures soon were unsuited for the types and extent of research the laboratory was called upon to perform. The small structures on the radio station grounds soon were overcrowded with personnel and equipment, and the wooden barracks buildings constituted a fire hazard which limited installation of valuable scientific equipment. In addition, the floor loading characteristics of the barracks buildings placed severe restrictions upon the amount of equipment that could be used at any one location. Accordingly, to provide for present and future research needs, plans were drawn in 1945 for the new series of laboratory structures costing an estimated 5 million dollars.

The project calls for a two-story front structure overlooking San Diego harbor, 650 feet by 50 feet, backed by five wings, each 194 feet by 140 feet. The total gross floor area will be in excess of 183,000 square feet. Contracts amounting to $1,153,360 have already been awarded for the construction of the first increment of the project representing 109,238 square feet of gross floor area. This increment will be a complete operating facility, containing heat and power centers adequate for the entire building. Roads and storm drainage facilities have already been contracted for.

Completion of the first increment will permit the removal of all supply and warehouse facilities from present inadequate, temporary structures. In addition, approximately a third of the professional personnel now housed in the wartime barracks and their technical assistants will be provided improved working areas in the new structure. Completion of the entire project, estimated for 1951, will permit the housing of all Laboratory personnel and facilities now in temporary barracks structures, in permanent modern buildings.

The physical identity of Radio Point Loma will not be lost in the rush of new laboratory construction. Rather the physical assets of the communications center will be incorporated into the overall plans of the research building program. The main radio station building, for example, from which point the Navy communicated with the Pacific Fleet during the Pearl Harbor emergency, is being remodelled to do a new job. It is being converted into a modern sound recording laboratory for continuing investigations in radio and sonar.

(An interesting history of Radio Point Loma was received too late for inclusion in this issue of SIGNALS. *It will be published in the next issue.)*

CIVILIAN COMPONENTS

OC Sig O Civ Comp Div.

Increasing emphasis on training Signal Corpsmen in the Army's civilian components has resulted in the creation of a Signal Civilian Components Division in the Office of the Chief Signal Officer. Back on active duty as its acting chief is a reservist, Col. H. C. Miller, who served during World War II with the Signal Corps.

The new division will handle Organized Reserve Corps, National Guard, and Reserve Officers' Training Corps matters.

Civilian Components Board

Secretary of Defense Louis Johnson has created a Civilian Components Policy Board to coordinate all policy and programs of civilian components of the armed forces.

The Board, which will be permanent, is authorized to study and evaluate all questions affecting the organized reserves of the Army, Navy (including Marines), and Air Force and the National Guard, both ground and air. Its members have not yet been appointed.

Under Secretary Johnson's directive, the Board will consist of a civilian chairman, a military executive officer, and 18 other members comprising two officers from each of the reserve components of the Army, Navy, Marine Corps, and Air Force, two officers from the Army National Guard and two from the Air National Guard, and two Army, two Navy (one from the Marine Corps), and two Air Force officers from the regular establishments. The Board will function on a full-time basis.

The purpose of creating the Board is to develop and coordinate, in the Office of the Secretary of Defense, all policies affecting civilian components of the armed forces. The Board will facilitate coordination of plans and programs of the civilian components with the strategic concepts of the Joint Chiefs of Staff, Secretary Johnson said.

NY Gets First AACS Res. Unit

Air Force reserve activities on the east coast took on a new look recently when Maj. Gen. H. M. McClelland and Brig. Gens. Wallace G. Smith and Ivan Farman extended Air Force approval to the members of New York's first Airways and Air Communications Service reserve unit.

The new organization, officially designated as the 3rd AACS Reserve Wing, is commanded by Col. Guy C. Bittner, Manhasset, N. Y., who served during the war with the Air Communications division in Washington, D. C.

The mission of the new reserve unit will be to facilitate the training, organization and administration of the AACS Air Reserve Officer in New York.

28th Signal Corps Affiliated Unit Is Activated

In the postwar period the Signal Corps and the communications-electronics and photography industry have been cooperating in the organizing of affiliated Reserve units. As these units were activated SIGNALS *made announcements of the individual activations without further comment. With the latest of such units to be activated (at the time of* SIGNALS *going to press) a fuller report is made including some of the background of Signal Corps affiliated units.*

By Frederick Reinstein,
Capt., SigC Res.

The 28th affiliated unit to be activated by the Signal Corps, since the end of the war, formally came into being at a luncheon ceremony in Washington, D. C., June 23rd. Sponsored by the Chesapeake & Potomac Telephone Company, Washington, D. C., the 804th Signal Base Depot Company is the 10th such unit to be sponsored by the American Telephone & Telegraph Company group. Made up of C & P employees, the newest unit will be commanded by Colonel Edward C. Cover, general personnel assistant on the staff of the vice president in charge of personnel relations of the C & P Telephone Companies.

Officials taking part in the ceremony were Brig. Gen. K. B. Lawton, Deputy Chief Signal Officer; C. H. Johnson, vice president and general manager of the C & P Telephone Co.; Col. H. C. Miller, chief of the Signal Corps civilian components division, who read the activation order; Col. F. W. Boye, senior Army instructor of the military district of Washington ORC; Col. Arthur Pulsifer, Second Army signal officer; and F. G. Macarow, vice president in charge of personnel relations of the C & P.

In organizing units such as the 804th, the affiliated program of the Signal Corps functions in cooperation with the civilian components division, OCSigO. It arranges with interested civilian industries for the sponsorship of units which would become cadres or nuclei for regular military organizations during war. This cooperative action has resulted in the communications and photographic industries signing contracts with the Signal Corps to sponsor a total of 33 signal units ranging from mobile radio broadcast companies to heavy construction battalions and depot companies. Not all of these units are yet activated.

In the recent war by means of such a program the Signal Corps obtained 5,427 technicians and key operating personnel. Much of this success was due to the advance planning and cooperation of the Bell System, and in the pictorial field, the Research Coun-

cil of the Academy of Motion Picture Arts and Sciences.

The affiliated program had its real start on October 13, 1939. On that date the Secretary of War approved the plan for procurement of wire communication specialists, as prepared by the American Telephone & Telegraph Co. On December 31, 1941, after much negotiation on the part of the Chief Signal Officer, the Adjutant General set in motion the signal phase of the affiliated program.

The first affiliated signal unit was called to active duty on February 28, 1942, and one of the earliest Signal Corps organizations shipped to the Pacific after the outbreak of war was made up largely of affiliated personnel.

Unfortunately, the first affiliated cadres sent overseas left without much military training because of the critical need for every type of communications personnel. Before long, however, training programs for all officers and enlisted men were initiated so that affiliated people were trained before reporting for duty with their units. Officers received nine weeks of basic military training at Ft. Monmouth before assignment. Enlisted men were transferred to inactive affiliated units and ordered to the central Signal Corps RTC at Camp Crowder for four weeks of basic instruction in the school of the soldier. Upon completion of training, the enlisted man went for temporary duty to his parent unit for a maximum of 60 days prior to the activation of his assigned unit.

In December 1942 enlistments under the affiliated plan were stopped and the Chief Signal Officer was authorized to negotiate with sponsoring civilian organizations to secure personnel through voluntary induction. Those obtained were transferred to the enlisted reserve corps and assigned to their respective units, remaining on inactive status until called to the colors. At that time they received the training specified for personnel previously procured through enlistment.

On June 30, 1943 the affiliated plan was terminated entirely. It had proved more successful than its World War I counterpart, in that most of the affiliated cadres were more widely distributed in the Signal Corps and contributed their skills at a time when they were at a premium.

The Signal Corps had been provided with experienced wire, radio, photography, and other specialists.

Col. F. W. Boye, Senior Army instructor, MDW, ORC (center), presents activation order of the 804th SBDC to Col. Edward C. Cover, company commander, while Brig. Gen. K. B. Lawton, Deputy Chief Signal Officer, and F. G. Macarow (left) and C. H. Johnson of the C & P Telephone Co. look on.

Industry had been assisted in that it had known in advance which of its key or technical people would be lost, and approximately when. And the affiliated program allowed the Signal Corps generally to better utilize civilian technicians, while also providing the affiliated soldier an opportunity for the practice and further development of his particular skill.

The C & P Telephone Company, like other operating companies of the Bell System, has long supported the Army's affiliated plan, which goes back to World War I. In the last war the company sponsored five signal units and is now taking the lead in the Washington area to organize affiliated units as a standby defense system for mobilization in the event of war. The C & P has just accepted sponsorship of a second Signal Corps unit, the 301st Signal Operations Battalion.

The following affiliated units have been activated since the end of the war. The listing is not by date of activation.

American Telephone & Telegraph Company (AT&T)

1. **803rd Hq & Hq. Co Signal Base Depot, Western Electric, New York City**
2. **849th Signal Long Lines Co, AT&T Long Lines Div, New York City**
3. **66th Signal Operations Bn, New York Telephone Co, New York City**
4. **61st Heavy Construction Bn, New York Telephone Co, New York City**
5. **98th Signal Operations Bn, New Jersey Bell Tel Co, Newark, N. J.**
6. **35th Light Construction Bn, New Jersey Bell Tel Co, Newark, N. J.**
7. **313th Signal Operations Bn, New England Tel Co, Boston, Mass.**
8. **850th Heavy Construction Co, New England Tel Co, Boston, Mass.**
9. **841st Tel & Tel Operations Co, Southern New England Tp Co, New Haven, Conn.**
10. **804th Hq & Hq Co Signal Base Depot, Chesapeake & Potomac, Washington, D. C.**

United States Independent Telephone Association (USITA)

11. **492nd Signal Installation Co, Kellogg Swbd & Sup Co, Chicago, Ill.**
12. **822nd Signal Installation Co, Automatic Electric Co, Chicago, Il.**
13. **491st Heavy Construction Co, Lincoln Tel & Tg Co, Lincoln, Neb.**
14. **301st Hq & Hq Det. Signal Service Group, Lincoln Tel & Tg Co, Lincoln, Neb.**
15. **217th Signal Depot Co, Associated Tel Co, Ltd, Santa Monica, Cal.**
16. **314th Heavy Construction Bn, Associated Tel Co, Ltd, Santa Monica, Cal.**
17. **233rd Tel & Tel Operations Co, Indiana Telephone Assoc, Indianapolis, Ind.**

International Telephone & Telegraph Company (IT&T)

18. **312th Hq & Hq Dt. Signal Service Bn, International Tel&Tel Co, New York City**
19. **844th Signal Radio Relay Co, International Tel&Tel Co, Clifton, N. J.**
20. **311th Signal Operations Co, International Tel&Tel Co, New York City**

Graybar Electric Company

21. **483th Signal Base Depot Co, Chicago, Ill.**
22. **321st Hq & Hq Signal Base Depot, San Francisco, Cal.**

Radio Corporation of America (RCA)

23. **490th Signal Radio Relay Co (AN/TRC-3), RCA Communication, San Francisco, Cal.**
24. **300th Hq & Hq Det. Signal Service Group, RCA Communication, New York City**
25. **406th Mobile Radio Broadcast Co, National Broadcasting Co, New York City**

Miscellaneous Sponsors

26. **834th Signal Pigeon Co, International Fed. RPU, Metuchen, N. J.**
27. **497th Signal Photographic Co, General Aniline & Film Corp. (ANSCO Division), Binghampton, N. Y.**
28. **800th Mobile Radio Broadcast Co, Delmar Jr. College, Corpus Christi, Texas**

KEEPING ON THE RIGHT TRACK with Sperry Loran

• With Sperry Loran, the navigator has time and weather under his thumb. He can follow the shortest, most economical track night or day, in fog or storm, in far-out or close-in waters. Ships with Sperry Loran get accurate fixes up to 1400 miles from land in 2 to 6 minutes.

• Operation of Sperry Loran is simple ... regular ship officers can operate Loran—no technician required. Accurate fixes are obtained by crossing 2 lines of position. A Time Difference Indicator for direct-reading of time difference saves time and prevents errors. Sperry Loran is independent of other navigational equipment.

NEW SPERRY MARK II DIRECT-READING LORAN PROVIDES MANY ADVANTAGES

The new Mark II Loran introduced this year by Sperry, offers improvements that provide simpler, speedier operation for bridge personnel.

SIMPLIFIED MATCHING OF PULSES. Automatic frequency control eliminates drift and aids in positioning signals.

FASTER MATCHING OF SIGNALS. Delay controls are motor driven and continuous. They do not operate in steps, never come against a stop.

IMPROVED READABILITY. "Black light" (ultra-violet) lights up large numbers on time-difference indicator and station selectors, does not interfere with night vision. Recessed scope face can be viewed in lighted chart room.

OPTIONAL MOUNTING. Small size and separate power supply permits a choice of four mountings — table or shelf, deck, bulkhead or overhead. Control panel can be tilted to suit operator. The Mark II Loran is backed by Sperry's service organization. Write our nearest district office for additional information.

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NEWS

The recently activated 804th Signal Base Depot Company is actually a new designation for the 3145th SBDC which had been activated by the central Signal Corps unit training center, Camp Crowder, Missouri, in July 1944. From January 1945 until the following January it saw service overseas at the Signal Corps Depot, Pacific Central Base Command, in the Hawaiians.

Second Army General Order Number 139, dated 10 May 1949 activated the Hq and Hqs Company of the 804th and authorized a strength of 20 officers, 5 warrant officers and 21 enlisted men. Initially the unit will be in a "C" status, which means that it carries only officers. These will receive retirement credits and a day's pay from the Army for each training period. When it reaches "B" status it will have its full enlisted complement and will then engage in regular unit training and have the same benefits as other organized Reserve and National Guard groups of the same category.

INDEX TO ADVERTISERS

Affiliation Program

Speaking at the Boston Industry-Army meeting, which was jointly sponsored by the local chapters of AFCA and other military associations, Colonel Elton F. Hammond, then chief of personnel and training for the Signal Corps and now on Army Department general staff, said:

"I would like to discuss briefly the Signal Corps affiliation program. Many of you are familiar with it, but since it is not well known to some I shall try to present the history, theory, and practice of this important phase of the Organized Reserve Corps in my few minutes' time.

"If it is to be really effective the affiliation program must receive constant cooperation and coordination from industry and the Army.

"The day may come when resort to arms as a means of settling differences between nations will be unnecessary. Until that day arrives our national security can be assured only by adequate military preparedness.

"Our nation is traditionally opposed to a large standing army; hence we must continue to rely on the citizens in arms, primarily the Organized Reserve Corps and the National Guard, to augment our Regular Army in an emergency. One of the obligations of citizenship is to bear arms in its defense. George Washington put it this way: '. . . every citizen who enjoys the protection of a free government owes his personal services to the defense of it.'

"You've all heard at one time or another, the complaint that the Army is expert at placing square pegs in round holes and vice versa. The affiliation plan of today is intended to place round pegs in round holes and square pegs in square holes; that is, to place technical specialists properly in the event of an emergency.

"The Army's affiliation program is based on the idea of civilian organizations (communications concerns, steel companies, chemical plants, laundries, etc.) sponsoring appropriate units of the Organized Reserve Corps.

"This principle is not new. In World War I the counterpart of the Signal Corps affiliation plan (although not known as such at that time) consisted of the formation of a number of telegraph battalions, and the supplying of personnel by operating Bell Telephone companies. In addition, the radio companies of two field battalions were organized largely from the personnel of the Western Electric Company. The independent telephone companies conducted a campaign to recruit qualified men for Signal Corps work and Western Union released many trained employees for military service.

"The World War I plan did not prove entirely satisfactory because the officers and men were concentrated in relatively few units, while many other qualified technicians were dispersed into other arms and services where their civilian skills were neither needed nor used.

"The World War II plan was conceived in 1939 as a direct result of two factors:

(1) The desire of the Signal Corps to establish a program in line with similar plans adopted for engineer railway battalions and for medical corps units; and

(2) The recommendation of the American Telephone and Telegraph Company proposing a planned withdrawal of their employees into military organizations in the event of a national emergency. This plan eliminated many previous difficulties. However some malassignments did occur.

"The major accomplishment of the World War II plan consisted of the fact that skilled technicians were trained as a cadre or nucleus of the inactive affiliated units for which they were to form the core or backbone. In this way, the skilled technicians of the country were spread out among a large number of units instead of being concentrated in a few, as in World War I.

"The present Signal Corps affiliation program applies the lessons learned in World Wars I and II.

"To illustrate how the new system works, here is the story of the New England Telephone and Telegraph Company right here in Boston:

"After being acquainted with the new program by the Army the company decided to sponsor a reserve outfit. It polled employees and they also liked the idea. A study of the specialties of personnel desiring to participate in the program indicated that a signal heavy construction company could be sponsored by the company.

"This unit will eventually consist of 7 officers and 195 enlisted men; however, the telephone company agreed to sponsor the unit on a Class 'C' basis which requires officer personnel only. If war should come, this company would be called to active duty to perform construction jobs for the Signal Corps. Its members would be doing work similar to that which they are doing now, under the same bosses and with the same associates.

"Graybar Electric Company of San Francisco has sponsored a hq & hq company, signal base depot; RCA a hq & hq detachment, signal service group; Western Electric a hq & hq company, signal base depot; etc.

"These and other similar units can step into the Army's service and supply system in an emergency and perform their assigned mission without having to undergo lengthy training. The work the members of these units would perform is similar to their civilian occupations; hence, when the armed forces are later demobilized they can resume their civilian occupations in a minimum time.

"Affiliated units are a part of the Organized Reserve Corps. These units normally will be maintained on an inactive status with cadre or key personnel furnished by the sponsoring organizations. The affiliated reservist is not a Regular nor a National Guardsman and can only be called to extended active duty at the direction of the President after Congress has declared existence of a national emergency."

Letters TO THE EDITOR..

Sir:

I have intended to write for some time, but handing over my appointment in the War Office over the New Year connected with getting into my home for retired life have left me very little spare time.

I, too, regretted that we did not meet again during my visit to the States. I have sown the seeds of the method adopted by your Association of keeping in touch with the young men of technical industry who would be wanted by the Signal Corps in any future war. I have hopes that they will bear fruit and that eventually our Association may work on similar lines.

I find your paper "Signals" of great interest and would particularly like to congratulate you on the Nov/Dec 1948 issue.

Sincerely yours,

C. H. H. Vulliamy
Hants, England

SIR:

I am happy to know that you have had favorable comments on my article about radar in Europe.* I thought the presentation was excellent; my only criticism is that you labelled a SCR-575 DF truck as the MEW Antenna. I am sure that many of the readers must have caught the mistake as well.

E. BLAIR GARLAND
Colonel, USAF

**"Radar in ETO Air-Ground Operations"—March-April 1949* SIGNALS.

Sir:

When "Signals" expanded to include "Sea" and "Air" I wondered if "Land" would lose its identity. Instead of this happening, the editors have done a wonderful job of blending the three, and adding to the knowledge of and application of, all branches of communications.

I was glad to see that photography is receiving more recognition. The magazine is excellent all-around.

F. M. Spurlock
Indianola, Ia.

Sir:

You will be interested to know that we are having a meeting towards the end of this month to decide on the future of our two Signal Corps publications, *The Wire* and *The Journal*, both of which go to you. I propose to wait until my elders and betters have talked round the point for some little time. I will then slap on the table six copies of *Signals* and say, "Gentlemen, that is the type of magazine you want."

I do hope it will not be too much trouble to ask at least some of the authors to let me reprint, but if the getting of permission entails any difficulty of correspondence, please do not attempt it.

Yours gratefully and sincerely,

H. R. Firth
Editor, The Wire
Hq. London Dist. Horse Guards
Whitehall, S.W.1

Sir:

I read every issue of your magazine "Signals" with great interest and I am very keen on fostering a similar organization in the Union of South Africa. Would it be possible to get a copy of your constitution and aims.

Yours sincerely,

Lt. Col. G. N. Robertson
Chief Signal Officer
Gen. Hq. Union Defence Force
Pretoria, South-Africa

Sir:

I can very well understand that because of the provisions of your constitution, only American citizens are admitted to membership in the Armed Forces Communications Association. That is very logical.

I share with you the pleasant memories of our association during the recent war with General Merlin, and for my part will always be happy if there is anything I can do to promote the good continuation of Franco-American relations.

Sincerely yours,

Oleg Yadoff

Sir:

Many veterans of World War II have requested this Bureau to supply them with information about reemployment rights under the Selective Service Act of 1948 and the older reemployment statutes. Reservists planning tours of active duty in the armed services are particularly interested in the reemployment provisions of the various statutes. We can make available to members of your organization who are interested in this subject, the following information material:

1. An Ex-Serviceman's Right to his Old Job.
2. Information About Your Reemployment Rights Under the Selective Service Act of 1948.
3. Field Letters 7 and 8.

Field Letter No. 7 contains a directory of the field and area offices of this Bureau. Individual reemployment problems should be brought to the attention of the field representatives listed in the directory who will be glad to render assistance to members of your organization.

Sincerely,

Robert K. Salyers, Director
Bureau of Veterans' Reemployment Rights
Department of Labor

Sir:

This piece of old antiquity regrets that it will be almost impossible to be present in Washington to attend your Third Annual Meeting. At my age of seventy-five, I am more interested in our Nation's welfare than I ever was.

I have personally known every President since the days of McKinley. I however don't know our comrade Harry over in the White House. Long before World War One I have watched these present-day conditions creeping upon the sleeping people of this country. Billy Mitchell was my good friend for years, my first meeting with him was when we happened to be stationed together in Havana, Cuba at the Hdqtrs of the late General Fitzhugh Lee as members of the Signal Corps. Later I was stationed at Hdqtrs of the late General Leonard Wood at Santiago.

But as I see things today (within and without the country) situations don't look good and it is up to good Americans to be on guard. In closing will say, here at home watch the termites.

Respectfully yours,

Jim Dixon

Sir:

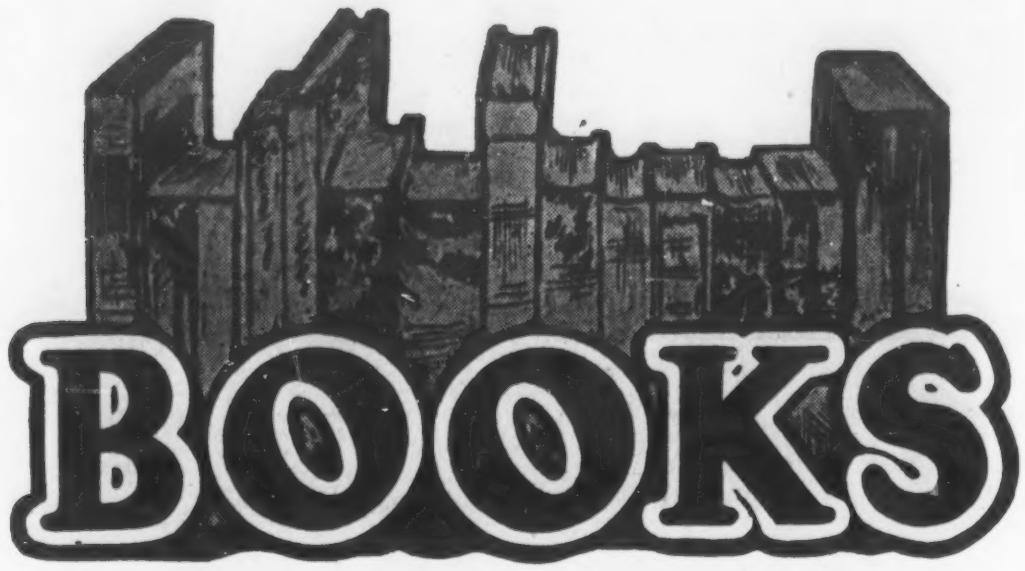
Greetings from Lagos the capital town of Nigeria. I saw your publication in a certain magazine, so I decided to write you these few lines of words, with great pleasure.

I am having a son who is at present in England and has completed his course in Engeiner. Also I am having a son who is with me. He will leave for America as soon as he finished his course in high school. He is at present in class IV middle.

Your own,

S. I. M. Johnson
Lagos, Nigeria, W.C.A.

[*Ed. note:* SIGNALS *obviously now reaches some of the far away places.*]



AND SERVICES

R. L. O'CONNOR, Secretary

"ELECTRON AND ATOM WON WAR."

MAJOR General Frank E. Stoner (USA, ret.), former Assistant Chief Signal Officer and Chief of the Army Communications Service, and more recently Director of Telecommunications Services for the UN, is collaborating in the writing and publishing of a book on the highly significant role and value of communications and electronics in World War II with Maj. Gen. H. C. Ingles, wartime Chief Signal Officer and now president of RCA Communications, and Orrin Dunlap, vice president in charge of public relations of the Radio Corporation of America. Tentatively titled, "The Electron and Atom Won the War," the book has been accepted by a leading publishing firm, and is slated for publication this year.

TV — "CRUSADE IN EUROPE" — Every Thursday evening for 26 weeks until October over the ABC-TV networks.

THESE televised films emphasize, as did the book, the miracle of Eisenhower's growth and ability to discharge the tremendous duties of Supreme Commander in this crusade. How could this man attain such stature?—a man who had been limited in his training to the command of small groups of troops available to him during his long years in that pitifully small and poorly equipped peacetime Army which our country felt was all we needed to support. How could we find so many qualified, brilliant commanders and staff officers for the countless key positions that had to be filled—and only with fully qualified officers? Eisenhower himself answers this in his letter to General Pershing in which he paid tribute to "our magnificent military educational system which was reorganized and expanded" under General Pershing's wise leadership. The pictures emphasize again that the important factor in the successes of the Crusade in Europe came from the tactical judgment and skill and the identical command and staff conceptions of U. S. regimental, division, corps and army commanders. "The stamp of Benning, Sill, Riley, and Leavenworth is on every American battle in Europe and Africa," as Eisenhower wrote and these pictures verify.

The film is a skillful editing job of footage shot chiefly by military photographers—both Allied and Axis. Some 80 per cent of the pictures have until now been restricted and not seen by the public. Unquestionably it is the best film yet made for television. It is most important as a reminder of America's carelessness and resulting military weakness before World War II, and the stupendous accomplishments we achieved by grace of delays for us created by the war in Europe 1939 to 1941.

RADIO AND TELEVISION MATHEMATICS, by Bernhard Fischer. The Macmillan Company. 484 pagest $6.00.

A PRACTICAL handbook and reference for anyone working in radio, television or other branches of electronics, this book gives the solutions for nearly 400 problems typical of those encountered in the construction, operation, and servicing of radios, television and other electronic equipment.

The problems, arranged conveniently under electronic headings, include all calculations commonly encountered in electronics, from those involving basic circuit components to those concerned with specialized elements in television and in modern control apparatus.

In each case the author shows how to set up the problem, as well as how to solve it; and all solutions are given in simple, logical steps with no steps omitted. In addition, the book contains a section of extra problems for practice, a complete compilation of formulas used in electronics, mathematical tables, a review of basic mathematics and the use of the slide rule, the J-operator, powers of ten and polar vectors.

THE CATHODE RAY OSCILLOSCOPE, by George Zwick. Radcraft Publications. 109 pp. 75c.

THIS book was written primarily for the radio serviceman and the newcomer in radio whose background is not an engineering degree, but a simple course in radio fundamentals, perhaps Signal Corps electrical experience or a correspondence course in radio. The book will help such a student to understand the instrument and how to use it intelligently, thus preparing himself for further study of cathode-ray tubes and their application in television and allied fields.

AN INTRODUCTION TO ELECTRONICS, by Ralph G. Hudson. The Macmillan Company. 97 pages. $3.30.

As the author states a careful reader who uses a dictionary with this volume will have no difficulty in understanding the fundamental principles of the science of electronics. Thorough reading will give a clear picture of the currently accepted theories of the constitution of matter, the nature of electricity, radio, science, sound and picture reproduction, fluorescent lighting, electronic controllers, and a few applications.

ORDEAL BY FIRE, by Fletcher Pratt. $5.00.

HERE, in countless details, flashes of insight and penetrations of character, the whole flaming story of the Civil War comes to life and into focus. Ordeal by Fire gives the reader a complete understanding of the logic of those years of fighting by studying the characters of men such as Hooker, Thomas, Sherman, Grant and Lee.

"The best one-volume history of the American Civil War."—Bernard DeVoto.

WORLD WAR I ARMY HISTORY. Vol. I, 426 pages, $3. Vol. II, 656 pages, $4.

THE long-awaited official history of the Army's effort in World War I has been completed in 17 volumes and is in process of printing. The first two volumes of The U. S. Army in the World War 1917-1919 are now ready.

The historical publication effort on World War I did not begin until after the war was over, greatly complicating the problem of collecting and appraising the basic records. This is in contrast with the historical planning for World War II under which historians were present at the front during all combat operations. This has facilitated the preparation of the history of World War II, three volumes having been released to date, with two additional volumes now at the printers.

The U. S. Army in the World War 1917-1919 tells the authentic story of the AEF in the form of carefully se-

lected letters, reports and other documents calculated to give a well-rounded picture of the AEF. It contains in addition many charts, maps, photographs, and tables never before published. A 70-page narrative summary in volume I provides an account of the principal operations on the western front following the entry of the United States into the war in 1917. The entire series will be of great value in understanding the developments of World War II, since a great number of its problems were closely related to those of 1917-1919.

STANDARD HANDBOOK FOR ELECTRICAL ENGINEERS, by Archer E. Knowlton. McGraw-Hill Book Company, Inc. 2311 pages. $12.00.

THIS eighth edition of one of the most authoritative handbooks on the subject has been revised to include the many comprehensive and profound technological developments of World War II. Hardly a section of the seventh edition remains unchanged. New magnetic materials, new insulations, new elements, uncovered by atomic energy discoveries, wholly new equipments such as serve mechanisms and rotating regulators, radar, and nuclear energy are treated in the new edition.

Much of the retained matter has been recast, rearranged, and, in some cases, amplified into an orderly and accessible compilation of the working tool information otherwise scattered broadly through technical literature.

Among the 26 sections are units and conversion tables, electric and magnetic circuits, measurements, properties of materials, circuit elements, transformers, and regulators, a-c and d-c generators, and motors, rectifiers and converters, prime movers, power economics, power system equipment, power transmission and distribution, building wiring design illumination, industrial and commercial power, electric heating and welding, electrochemistry and electrometallurgy, battries, wire telephony and telegraphy, electronics and electron tubes, radar, codes and standard practice and electrophysics. The index is detailed and easily used. Page numbering by sections facilitates ready reference.

NO PLACE TO HIDE, by David Bradley. $2.00.

NO PLACE TO HIDE is the story of what an atomic bomb can do to ships, or water, or land, and to human beings. It was written by a man who acted as radiological monitor at the Bikini tests —a man whose business it was to measure the radioactivity which was left *after* the bomb had exploded.

Some people are wondering why the Navy is towing battleships out to sea and sinking them by gunfire. David Bradley tells why—quietly and effectively.

After the underwater explosion at Bikini, every tarred seam, every painted deck, every hull was broadcasting a warning of ugly death. The water of the lagoon, the floating oil slick, the sand of the bottom, the coral and rocks radiated destruction. And even after shorter-lived radiation faded the men-

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MICROWAVE ANTENNA THEORY AND DESIGN, by Samuel Silver. McGraw-Hill Book Co., Inc. 623 pages. $8.00.

IT is suspected that Volume 12 of the M.I.T. Radiation Laboratory Series was somewhat late in being published because the authors undertook an almost impossible task, namely, the inclusion of all major microwave antenna work done in this country and in Great Britain. At any rate, the book was eagerly awaited by microwave specialists for many months.

So much effort was expended in the various laboratories in attempting to develop a logical procedure for microwave antenna design, which in general requires empirical treatment, that the amount of knowledge so derived could not be compressed into a single 600 page volume. The book does a great service, however, by providing solutions for fundamental antenna development problems.

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Journal, The Franklin Institute.

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THIS—IS FORT MONMOUTH. Signal Corps Publications Agency. 50c.

In late 1945 an excellent history of Fort Monmouth was published which told the story of this great training, research and development center for Army communications and photography from its establishment in World War I through World War II. Now a beautiful illustrated booklet describing the Fort Monmouth of today has been prepared by the SCPA. Those who have served there, those who expect to, and those who for other reasons are interested in the activities of this great military center, will find this booklet gives them a fine picture of Fort Monmouth as it is today.

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